THE IRON AGE

New York, Thursday, January 20, 1910.

The Worcester Polytechnic Foundry Lecture Room.

BY R. H. PALMER.*

A new lecture room has recently been fitted up in the foundry at the Worcester Polytechnic Institute, Worcester, Mass., where foundry practice is a part of the course in mechanical engineering. Here demonstrations of molding will be given the members of the Freshman Class before they go to the benches to do molding themselves, and oral instruction to the more advanced classes in foundry practice. The room will seat 30.

In front of the seats, as shown in Fig. 1, is a molding bench, provided with snap flask, iron bands, bottom boards and mold board, parting sand box containing parting sand, and necessary small tools, boshdish and rammers. Arranged to move from under the bench is a wooden box, mounted on wheels, containing the molding sand, shovel and riddles. When a mold is made on the bench the sand overflowing the flask falls through slots in the top of the bench into the box beneath. When the bench is not used for molding purposes, the sand is wet down and covered with a cloth, and the box is wheeled back under the bench out of the way.

During lectures given the more advanced classes, the bench is used to place models on. In one of the accompanying views may be seen a loam mold seating, which is used to illustrate making the seating for a loam mold. When giving instruction regarding sweeping up pulleys, the model seen on the table at the right is used. These models are constructed so that they can be taken apart and the different operations explained and illustrated.

Over the bench is placed a rail to support a block and fall. The chains may be seen hanging over the side of the bench. These are used to demonstrate the use of the strapping for rolling over and ways of handling flasks. The students later go down into the foundry and use the crane to practice the instructions. On the table to the right of the bench is a flask used with chains, cope and nowel. Wooden flasks are also used.

Under the table is a pulley mold swept up and weighted down; the weights show the student how such weights are cast when making foundry rigging so they can be broken up and melted up if wished, and their placing on the mold show how they are used in weighting the pulley mold. There are also pieces cast to represent pig iron, seen on the rim. On the table is a pulley mold with arm cores placed and spindle set, coming up through the center with the finger on the spindle and sweep set for sweeping the inside of the pulley in forming the mold.

Fig. 1.—A View in the New Foundry Lecture Room at the Worcester Polytechnic Institute.

On the table are chaplets used to illustrate, in connection with a small column pattern, how cores are chapleted and held in place. Gear patterns are seen at the right end of the table, and on the shelf above are horn gates used to explain how small gears are molded and poured.

On the first shelf above the table are pulley arm cores, and with them the boxes they were made in and covering core boxes for making the covering cores for covering the rims of pulleys. A number of styles are shown, and also a pattern of a flywheel segment to illustrate how segments are molded. This is used as

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a part of a built-up 28-ft. diamter flywheel, such as is used in wheels for cotton mill engines and stationary engines up to 108-in. face.

On the second shelf are models showing how center cores are made for cylinders on arbors, using hay rope and loam and other models for making the larger cylinder center cores on cast iron arbors, using a dry sand mixture to cover them. Different kinds of gates make clear the care necessary to obtain clean castings for finished work.

The third shelf contains patterns of building columns, showing how castings crook in cooling off. Castings are used showing imperfections in imperfectly proportioning patterns for castings, or imperfect design. The tendency to sponginess at times is also illustrated on the blackboard. Wedges are cast of iron and broken in pieces, and the pieces are put before the students that they may see the granular formation of the iron in cooling owing to the influence of silicon, sulphur, &c. The scored wedge pattern is seen nearly in line with the left corner of the table.

Above the blackboard is a square board on which are mounted different molders' tools with their names in aluminum strips, so the student may familiarize himself with their names.

The blackboard is used to illustrate many points in making a mold. To the left of it are a number of shelves holding glass jars, in which are samples of molding sand from Connecticut, New York, Ohio, New Jersey, Kentucky; fire sand from many States; core sand from the New England hills and the beach of the Great Lakes; clays as well; iron ores from the lake ranges and others; core compounds, core oils; leads from Germany, Austria, Mexico, Island of Ceylon, raw as imported in some cases and as ready for use in others. Many kinds of brass and iron foundry supplies are represented here, as well as samples of steel foundry supplies, from ground quartz to silica rock, and from silica sand to fire clay, and dolomite to magnesite, &c. When the students have papers to prepare on foundry subjects, they may borrow the samples to illustrate their papers, when they deliver them before their class. These exhibits were contributed by steel manufacturers, and S. Obermayer & Co., F. B. Stevens and Cutter, Wood & Stevens.

Above the blackboard on the walls are photographs of sand mixing machinery from the Standard Sand & Machinery Company, at the left blue prints made from drawings of cupolas, with such titles as "Where cupolas burn out lining," "Charging cupola at different works," "The Knoeppel cupolas," &c. At the left are photos of Tabor and Arcade molding machines and sand blast equipment from the Thomas W. Pangborn Company.

Fig. 2 shows the room to be well lighted from four windows back of the seats, which also furnish ventilation, and for artificial lighting there are nine incandescent lights, one arranged to be lowered over the table to throw light into mold during demonstration. At the left of the room on the wall are protographs of the latest molding machines built by the Tabor Mfg. Company, and at the right photographs of foundry equipment in use in the Chicago, Milwaukee & St. Paul Railroad, and the Dickson Car Wheel Company's foundries furnished by the Whiting Foundry Equipment Company. In addition to these are blue prints contributed by the Northern Engineering Company of cleaning room and foundry equipment.

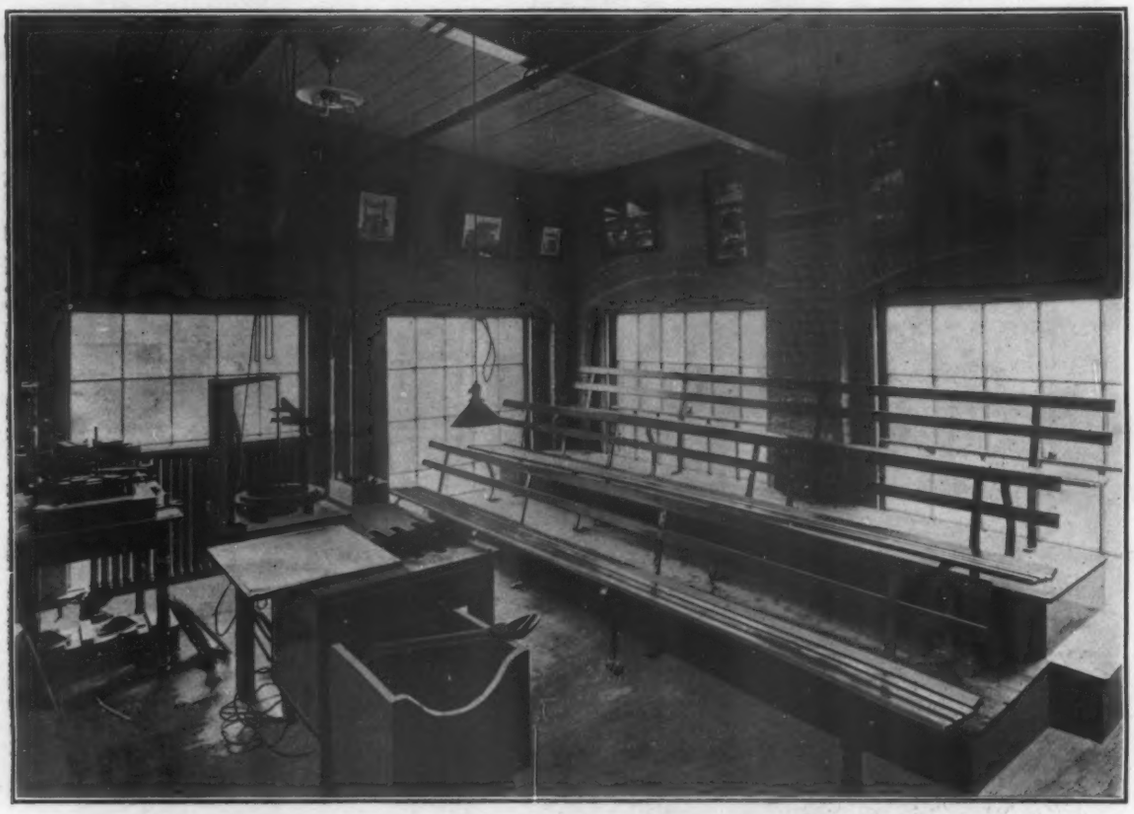

Fig. 2.—Another View in the Worcester Polytechnic Foundry Lecture Room.

In Fig. 1 may be seen a frame containing pictures of quite a number of different styles of molding machines, taken from magazines, in addition to which there are numerous other blue prints and photographs on file that are hung up when a lecture or demonstration is given.

Edward P. Remington, making a specialty of newspaper advertising, and who also handles advertising accounts of manufacturers, has removed his offices from the Heeren Building, where he had been located for some years, to the new Jenkins Building, Liberty avenue and Fifth street, Pittsburgh, where he has secured larger and more commodious quarters.

American and European Machine Shop Methods.—II.

The Shops and the Industrial Schools.

BY WILLIAM H. DOOLEY.*

The Munich School for Machinist Apprentices.

This school provides a good general education, good technical education for the machinist and good education in the rights and duties of citizenship while he is learning his trade. Attendance upon this school is obligatory for the apprentice throughout the whole period of apprenticeship. For helper and master workman courses the school is voluntary.

The individual subjects of instruction, which are in the closest possible connection with the requirements of the machinists' trade, are as follows: Religion, trade calculations, with bookkeeping, business corporation and reading, the study of life and citizenship, mechanical drawing, physics and machinery, materials and shop work.

The weekly period of instruction is 10 hours for all classes, of which 3 hours come on Saturday morning, from 9 to 12 o'clock, and 3 hours each on two working days, from 9 to 12 o'clock in the morning, or from 4 to 7 in the afternoon. By this arrangement of hours, as well as in the assignment of the individual classes to different week days, is rendered possible a suitable change in school attendance in the interest of the workshop management.

On account of the hours of employment no instruction is given after 7 p.m.

The subjects of instruction and hours devoted to each subject are given below:

	Hours of instruction.
Religion	1
Trade calculations and bookkeeping	1
Business composition and reading	1
Studies of life and citizenship	1
Mechanical drawing	3
Physics and mechanics	1
Machinery	1
Materials and shop work	1
Total	10

The instruction in physics and machinery, as well as in materials and shop work, is undertaken by a skilled machinist; the remaining instruction is imparted by the appropriate teachers of the common and continuation schools.

The cost of instruction is defrayed by the city, which also furnishes the necessary quarters for instruction. To make attendance easier, it is arranged that when possible classes meet in school buildings near their homes.

All metal manufacturers that are in a position to do it are pledged to support the school by giving the free use of machinery, models, &c.

Apprentices who have not satisfactorily fulfilled the required school attendance can by arrangement on the part of the master or of the school be permitted to further attend the whole or part of the instruction of a class.

Following is a statement of the rules governing this school, together with the course of instruction:

Rules and Course of Instruction in the Munich School.

Voluntary attendance in a class or a technical lesson is permitted to apprentices who are no longer required to attend school, and to helpers also. The fee fixed by law for such attendance in class is 50 pfennig per hour a week per year.

Those apprentices whose houses or shops lie at a great distance from their schoolhouse will receive, upon application to the Board of Directors of the street railway, school tickets for the half year for the sum of 2 marks.

DIVISION OF SUBJECTS.

The selection and arrangement of the subjects are outlined as follows:

Calculations and Bookkeeping.

The first object of the instructions and calculations is to make accessible to the apprentice the necessary knowledge for a sound conduction of business and simple economical housekeeping. The second object pertains to the trade, and the instruction must gradually carry the pupil to the point where he can grasp the geometrical and similar construction calculations of machine building, and as far as possible carry them out independently. It is necessary to introduce the simplest form of equational calculations in order to obtain a clear and simple presentation of the mathematical laws of physics and mechanics. But the equations to be formed in this work are always devised from simple practical problems, and before their incorporation in lettered formulæ are to be formulated clearly and practically in corresponding equational wording. Accordingly the instruction in calculations is in the following fields:

Class I. *a.* Common calculations—services for hours, days, weeks and months. Income book—its monthly and annual balancing. The daily, weekly, monthly and annual expenses of an individual, of a family—household book, monthly and annual closing. Economical expenditures and their illustration.

b. Geometrical calculations—simple calculations of surfaces (four-sided surfaces) as applied to flat working material (sheet tin, plates, &c.). Computation of contents of prism formed bodies and their weight and price calculation.

c. Equational calculations in connection with the previously mentioned geometrical problems, then also with the physical problems involved (lever, motion, velocity), final fixing of the ideas of equality and inequality; finding of individual values in an equation.

Class II. *a.* Business calculations—the buying of different metals and other materials of the industry. Rebate for cash payment, transportation and other business expenses. Expenditures for working materials, workshops and mechanical appliances, life and fire insurance.

b. Geometrical calculations—calculation of triangles, circles and cylinders as applied to the form and contents of round pieces of work (faucets, casks, axles, wheels, &c.). In addition, weights and cost of materials.

c. Equations. Continuation in the making up of equations in the fields of geometrical and physical calculations (rotation, friction, heat, expansion).

Class III. *a.* Business arithmetic, bookkeeping and exchange. The business books of simple bookkeeping (inventory, day and cash books and ledger), their monthly and annual closing, adjusting and balancing them, liquidations, bills of exchange, their kinds and use, bill book. In connection with bookkeeping—simple calculations of cost and estimates of expenses for things for the household and work.

b. Geometrical and equational calculations—continuation in the same kind of problems already given, but more advanced work. The cone and ball in machinery. Calculation of the weight of an object by means of the weight of the model. The right angle triangle and the theorem of Pythagoras. The extraction of the square root. Further practice in examples from physics and mechanics.

Class IV. *a.* More comprehensive calculations of cost. Reason and aim of the calculations. Fixing of the cost of materials, of pay for work, from practical examples. Working expenses and their calculation based on the materials and wages. Finding of the profit in per cent.

Business Composition.

The instruction in composition must make the pupil capable of correctly preparing all important written communications of a private and business nature, as regards their expression, spelling and form.

Class I. Ordinary letters (to members of the family, relatives and friends, about the life and business of the apprentice, also using appropriate matter from the other instruction). Business letters—inquiries, information, offers of services, application for a position, advertisements, statements of loans and refusals. Apprentice contracts. Business recommendations. General writings. Communications for publication.

Class II. Compositions regarding buying and work. Epistolary and published bids for wares and work, price inquiries, ordering of wares, directions for work. Purchase agreements. Business directions and instructions for deliv-

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ery. Bills, receipts, partial payments. Refusals of payment, grievances, excuses, judgments and recommendations.

Class III. Compositions concerning debts—credit reputation, certificates of debt and citizenship; dunning letters, granting of delays, remission of accounts, debts of bills of exchange. Written intercourse with officials—petitions to the magistrate, building department, manufactory inspectors, police, lower court. Reports on the local economic and social conditions, to the Department of Trade and Industry, to the Government, to the administration.

The instruction in reading in connection with the subject of citizenship has for its object the furthering of a general and broad development of the pupil and the awakening within him of pleasure and taste in good literary productions. In so far as the reading book treats of the calling of the pupil, this matter is used in his technical instruction. The selection of the reading matter for the individual classes is left to the teacher.

The Study of Life and Citizenship.

These branches of instruction are to give to the pupils an insight into a sane and spiritual conduct of life, and it therefore treats of the problems of hygiene as well as the problems of life in connection with the calling, society and the state, with special consideration of those fields from which the pupil can best obtain a knowledge for the necessary unification of the interests of all conditions of people and industrial groups. The subject matter is divided as follows:

Class I. *a.* Hygiene.—The construction of the human body. Nutrition. Food and luxuries; breathing, circulation of the blood, care of the skin and teeth. Dwellings and clothing. Work and recreation. Gymnastics and exercise out of doors. The influences detrimental to health in the industry, especially the bad effects of dust; first help in the accidents of the industry. Fostering of cleanliness.

b. Deportment—demeanor in the house and outside, in the workshop, toward acquaintances, in school and in society.

Class II. Industrialism.—History of hand work in general and of machine construction in particular. Beginnings in the construction of so-called machinery in ancient times (Chersiphron, Mentagenes, &c.). Significance of rotary motion for nearly all machines. Mechanical contrivances for war and conveyance in the middle ages. Discontinuation of the machines of the older times by the invention of the steam engine. (Papin, Newcomen-Watt, Woolf, Stephenson, Fulton.) Recent engine construction (Vorsig, Hartmann, Zimmermann, Krupp, Gruson, Imperial, Germania and Vulcan dockyards). The most important engine shops of Munich. Allied industries. The present day condition of engine building. The most important features of the industry. The protection of designs (through patents).

Class III. Citizenship.—Communal government. Problems of communal society, its social and economic arrangements. Rights and duties of the communal citizen. Communal titular officials. The state constitution of Bavaria. Problems of states unions. Duties and rights of the citizens of the state. Titular state officials. The Bavarian state government. The constitution of the German Empire. The problems of the empire. Social legislation. Commerce and trade in the nineteenth century and their significance for the well being of the citizen and industrialist. The value of German consuls in foreign countries.

Class IV. The citizen of the state in public life.—Human society—the social and economic distinctions in it, their origin, necessity and present development. General social and political economic systems. (Legislation, administration of rights, security, culture and public safety). The part taken by the citizen of the state in the advancement of the common interests of life. The advantage of life under a united states government. Germany's economic and cultural position in the world. Supplementations of industrial legal knowledge, especially legal instructions for conducting factories, steam plants and such mechanical systems. Accident insurance.

Mechanical Drawing.

The object of this instruction is to give the pupil a certain amount of training in the use of drawing instruments and in addition the capability of following out working drawings without difficulty; the pupil must also learn to make a dimensional sketch of any part of a machine, from which work can be done or a working drawing made.

Special value is attached to exercising the pupil in the correct statement of the necessary measurements.

Then follows free-hand sketching.

DISTRIBUTION OVER THE FOUR YEARS.

The subject matter is distributed over the four years as follows:

Class I. Instruction in the use of the ruler, angle and circle. Copying of measurements (fluted metal plate, perforated metal plate). Division of distances, angles and circles. Hexagons (receiving nut, ratchet wheel). Contact between straight lines and circles; and between two circles, the one with the other (screw pegs, plates, flanges, stock stands). The most important curves. Chain links. Representing of materials by colors and by cross hatching (section of rolled iron).

Class II. The representations usual in the machine industry, in ground plan, vertical section and in necessary cases in profile. Sketches of simple models giving special consideration to the substance. Making of drawings from sketches. (Models for this—simple pieces composed of rolled iron, plates, slides and guide pieces; rivet bolts.) Representation in section. Continuation of the drawing of models (covers, packing box spectacles and cases, anchor plates, pieces of tubing, store scales, foundation plates, smelting hearth, sliding pieces, axles and shafts, bolts and pins). Treated surfaces.

Class III. Plane sections, triangle prisms, cylinders, cones with their development. The most important curves and their construction—transition curves in rounding out (smoothing irregularities). Curves between turned and plane surfaces (cross pieces, piston rod heads, rod ends, receiving nuts). Penetration of two cylinders with developments. Representation of normal screws. Screw joints. Rivets and rivet joints. Drawing of more difficult models (valves and cock boxes, cross head, forms of lever and piston rods, guilding appliances, regulator arms, &c.).

Class IV. More difficult model drawing according to proportions of the given model; for the continued development by the brazier. The drawing of separate objects and larger working drawings.

Physics, Mechanics and Descriptive Machinery.

In this instruction the pupil must be familiarized with the working of the most important natural laws, with continual reference to their practical application. The instruction in descriptive machinery shows the pupil the important appartus and the chief machines, both as to arrangement and method of action with reference to the applied physical laws.

Class I. Motion.—Uniform straight lined motion. Velocity—motion in a circle. Transformation by rim driving and cogwheels. Transformation conditions for the turning lathe; connecting gear. Screw cutting on the turning lathe. Force, its representation by drawings. Composition and resolution of forces; parallelogram of forces. Moment of force, superimposed pressure. Work, effect. Simple machines—lever, wheel and axle, pulley, movement along a surface, inclined plane, screw, worm wheel, force, mass energy, centrifugal force. Friction.

Class II. Qualities of rigid bodies.—Molecule and atom. Cohesion, elasticity. Principles of tensile strength, resistance to compression and shearing strength. Qualities of fluids. Horizontal surfaces; hydrostatics. Transmission of pressure; hydraulic press. Bottom and side pressure. Outflow, buoyancy and floating. Qualities of gas. Expansive force ond tension. Law of Mariotte. Air pump. Expansion air balloon. Heat. Expansion of bodies. Melting, melting point. Evaporation, vaporization, boiling. Boiling point. Saturation and superheated steam. Amount of heat. Caloric—specific heat. Heat of melting, heat of vaporization, quantities of heat.

Class III. Grouping of the units of machine construction and the means of measuring them.—Measures of length. Vernier, sliding gauge, calipers, measurements of cavity and depth, vacuum, calibrating rods and rings (tolerated exhaust). Determination of weight (usual scales, quick scales, platform scales, spring scales). Measure of tension (fluid and spring manometer). Determination of times of revolution and velocities (cyclometer, tachometer). Determination of amount of work (Prong's dynamometer and brake experiments).

Class IV. The steam engine; the actions within the cylinder and their representation by drawings. Diagram and indicator. The steam distributer. Aim and arrangement of condensation. Arrangement of the steam engine. The most important features of the steam boiler. Motors actuated by explosions with and without special arrangement for ignition. Regulation of water power and its employment to advantage.

Materials and Work.

It is the function of the instructors to familiarize the pupil with materials used in his trade, their source, how they are obtained, their qualities and how they are worked, and to introduce to him the most important working appliances and methods of work.

Class III. Iron—source, method of obtaining it, its qualities and how it is worked. Blast furnace—pig iron, cast iron and malleable iron. Ingot iron and forged iron. Ingot steel and forged steel. Finery process—puddling, Siemens-Martin process, Bessemer process. Conversion into steel and tempering. Casting, forging, rolling and drawing with the appliances pertaining thereto. The fuel—hard coal, charcoal, gas.

Class IV. Copper, tin, zinc, lead, nickel, aluminum as regards their occurrence, obtainence, characteristics and working up. The most important alloys as regards composition, characteristics and working up. The chief working tools and working tool machinery. Grinding, cleaning, corroding, etching. Mention of typical objects of manufacture in the line of progressive development.

Religion.

The same topics as in the general continuation school, according to the direction of the bishop of the diocese or of the Protestant higher consistory.

It is in these continuation schools that those who are to form the rank and file of the metal trades receive their theoretical and basic training.

Special Trade Schools for Machinists.

In addition to the continuation schools there are special trade schools for machinists, as the one in the Berlin School of Trades and Crafts. The trade school for machinists has for its object the education of skilled workmen in machinery of precision and electricity. It aims to render capable of acting as laboratory assistants, foremen or superintendents of mechanical establishments. It also furnishes a basis for further studies in the special lines of machinery of precision and electrical engineering. The course covers one year and begins in October. The subjects and number of hours per week devoted are as follows:

	First term.	Second term.
Mathematics	5	2
Physics	6	5
Practical exercises in mathematics and physics	2	2
Chemistry	4	4
Applied mechanics	2	2
Study of instruments	4	4
Electro-technics	4	4
Technology	3	3
Drawing and designing	13	13
Exercises in physical laboratory		5
Totals	43	44

These subjects are taken up with great thoroughness. Entering pupils must have had a three-year apprenticeship in a mechanical establishment, and must also have worked as journeymen in a corresponding concern. In certain cases, and provided the pupil possesses a good preliminary theoretical education, a shorter practical education may be considered sufficient. Pupils must be capable of expressing themselves clearly in writing, and without any crude orthographical errors. A written account of his life is exacted of each.

In mathematics the pupils must be familiar with common and decimal fractions and four rules of arithmetic. They must know the fundamentals of algebra, and must be familiar with the solution of equations of the first degree with one unknown quantity and with the elements of plane geometry.

The winter term begins in October, the summer term in April. The tuition for each term is $15. Pupils of small means may be allowed free scholarships by the Board of Directors. Foreigners pay five times the amount of tuition just mentioned.

Schools for Workingmen.

When workingmen of the different metal industries have completed the courses in the lower industrial schools—continuation and trade schools—and desire a preparation for positions between journeyman machinist and engineer or draftsman, they have every opportunity, as there are four classes of middle technical schools preparing for the above positions. They are: The schools of industry (industrie schulen), the master workmen's schools (werkmeister's schulen), the higher trade schools (höhere schulen) and the technicums. All these industrial schools are of the nature of technical schools, and they are intended for those with a definite purpose in mind.

The schools of industry (industrie schulen) and the master workmen's schools, which have existed for many years in some sections, were for the purpose of offering a higher education to the skilled and ambitious workmen in the metal trades.

The master workmen's schools are more ambitious in their aims than the lower industrial schools. They were established for the purpose of preparing the apprentice journeyman to become master workmen. No pupil is admitted before the age of 16, and he is expected to have had two or three years of practical experience in the machinists' trade. The studies are chiefly in the direct line of the machinists' trade, and the course required is from one to one and one-half and even two years. The pupil must devote his whole time to the course. The instruction in these schools is closely specialized, and the classes are open only to the most industrious students. The tuition fees are small.

These schools have long been popular in Germany among the metal workers, and are intended mainly for men of a much larger workshop experience than the minimum limit, who wish to broaden their trade horizon. They take in the older men in the metal trades, those who have been long out of school and who never expect to become thorough book students, but whose strength lies in their shop skill. These men have only moderate aspirations for advancement; they may be ambitious to own little machine shops of their own, but do not expect to rise high in the scale of superintendents or become the heads of great industries. Such men usually have receptive minds and possess good judgment. They expect to obtain in the schools through direct practical teaching the necessary theory to enable them to carry out the higher demands of the trade.

Such schools have been, and must of necessity remain, to a great extent evening schools, for they have existed to give the man who by his superior abilities has come to the front in the machine shop a chance to prepare himself for higher duties. It takes years, however, under ordinary conditions, for this man to impress his peculiar fitness for a foreman's duties on his superintendent or employer, and he has attained early middle age at least before recognition comes to him in the form of an offer. In all probability he then has a family dependent upon him, and under present conditions he cannot give up his day work to attend a day school.

The higher trade school (höhern schulen) for machinists and metal workers are in some respects the most advanced type of these middle technical schools, since they demand for entrance both a fair degree of advancement in elementary mathematics and physical service and well developed skill as a workman. These schools are expected to develop ambitious young men who may expect to attain to the higher positions in larger machine shops and metal manufactories where "practical" men are needed; and some of them may even enter the technical universities to prepare themselves for the highest engineering positions. In studying the student enrollment one finds many of the students are not following their father's calling.

Since these higher industrial schools of Germany provide for those who are engaged in the machinists' and metal trades, and who can give a part or all their day time for a couple of years to the preparation for higher duties than those of journeymen workers, it stands to reason that these are, as a rule, younger men than those who attend evening classes in the master workmen's schools. As a matter of fact, this higher education now required of supervisors of workmen in the metal industries has become such a long road to knowledge that the hour or two a night given to study on a few nights in the week is no longer sufficient to give the required preparation.

The Technicums.

The technicums have in many instances a lower age limit than the other schools—no pupil under 15 years of age being admitted—and require for admission a year or two of high school study and only a year of practical experience in the machine shop. Thus it becomes essentially a low grade school of practical technology.

It might be of interest to say that these schools are all intended to fulfill the same general object, but that differences in detail arise from different ideas as to the manner in which results may be attained, as well

as the different local conditions which exist and the different classes of persons to be provided for.

The German technicum for metal workers is a modern institution, most of the schools having been established within the last 10 years, and all more or less in an experimental stage. The technicums are also under the supervision of the state. Examinations for graduation are conducted by commissioners of the Government, and diplomas are awarded. The tuition fees are from $3.50 to $125, according to the school.

The importance of these schools cannot be too highly estimated. They are the main pillar by which the German metal industry has reached its high standard and the Government and manufacturers are doing their utmost to encourage this type of education.

The highest industrial schools in Germany represent the high special engineering schools. The aim is the same as the technology schools in this country, the training of the higher classes of engineers. The heads of the departments and of the mechanical industries are graduates of these schools.

Schools Do Commercial Work.

In all the training and education for metal industries in Germany great stress is laid on the workshop. A great danger that has been urged against educational technical shops is that the pupils learn to be extravagant with the material provided for practice, and do not learn the shop economics of practical life. This is guarded against in the German schools by doing work on a commercial scale. The products of the schools are nearly all sold and in many cases material is supplied by the metal trades in a raw state (rough castings from the foundry for the machine shop) or practically manufactured state to be worked up in the various departments. The actual conditions of the machine shop, foundry, &c., are thus observed in the schools to as a great a degree as possible.

All these schools have large staffs of lecturers, workmen and assistants; they also have accommodation for their work. No other country in the world is meeting so well the industrial educational needs of the metal trades.

It might be of interest to know that the writer was obliged to get permission from the Commissioner of Education in Berlin to visit the Prussian metal schools. It was necessary to wait two weeks for permission and then only after the writer had stated the schools he desired to visit and the exact departments.

(*The end.*)

The Toledo Electric Welding Company Moves to Cincinnati.—The Toledo Electric Welding Company, Toledo, Ohio, has increased its capital stock from $30,000 to $75,000 and will move to Cincinnati, Ohio, where it has closed a long lease on a two-story modern brick factory building, 60 x 160 ft. A fine equipment of machine tools is being installed and the plant will be in full operation about February 1, manufacturing a complete line of electric welding machines for any kind of work. The officers of the company are as follows: Neil Macneale, president and treasurer, Walter G. Franz, vice-president; Frank Warren, secretary and general manager; they, with G. W. Drach and J. A. Muir, are the directors. Messrs. Macneale, Franz and Drach are well-known Cincinnati business men. Mr. Warren, who has been connected with the company since its inception, will move to Cincinnati by the time the factory is ready for operation, and nearly all of the Toledo employees will go there at the same time.

The West Side Foundry Company, Troy, N. Y., which manufactures high grade architectural and ornamental castings, also floor work and fine bench castings, has been obliged on account of the growth of its business to build an addition to its plant. The new addition adds about 150 ft. to the present capacity of the foundry and has provided work for 25 to 30 additional molders.

A Large Machine Made Nut.

What is probably the largest steel nut ever turned out on a forging machine was recently made by the Newport News Dry Dock & Shipbuilding Company at Newport News, Va. The nut was turned out on a 4-in. heading, upsetting and forging machine made by the Ajax Mfg. Company, Cleveland, Ohio, and the usual nut and bolt stock used at the shipbuilding plant was utilized. The nut was made from a piece of 4-in. stock which was headed up on the machine as though it were to be used for a large bolt, after which the shank was punched out, which left the head as a rough nut ready to be machined. The nut had a 4-in. center

A 4-In. and a 2-In. Nut Made by the Newport News Dry Dock & Shipbuilding Company on Ajax Forging Machines.

and was approximately 8 in. in diameter. It is shown here in comparison with a 2-in. nut, which the shipbuilding company has been turning out in large quantities.

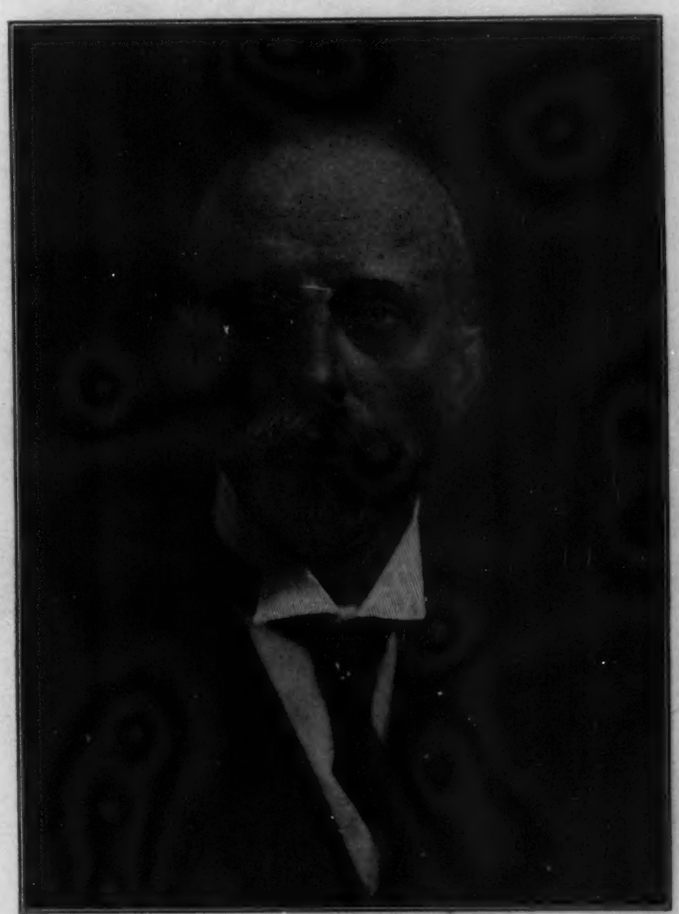
It can be seen from the illustration, which shows the nut exactly as it came from the forging machine, that but little machining was required to finish the nut in good shape. The interior was especially clean and it was a simple matter to do the threading. The amount of the machine work required on the exterior was but little and it consisted mainly of trimming the edges. Heretofore the shipbuilding company has made such nuts as these by hand, but the experiment of forging by machine has been so successful that it is declared that they will henceforth be made in that way.

The Midvale Steel Company.—At the annual meeting of the Midvale Steel Company, Philadelphia, Pa., January 11, Charles J. Harrah was elected president; James F. Sullivan, vice-president, and H. M. Diemer, secretary, with the following directory board: Mr. Harrah, Mr. Sullivan, Alex Petre, Chas. B. Dunn and Howard Sellers. The annual report for the fiscal year ending October 31 last showed net earnings of $555,347, leaving a surplus of $405,347 after the payment of dividends of 20 per cent. The report showed the company to be in a thoroughly prosperous condition and it is stated that order books are well filled.

A TRIBUTE TO CHARLES KIRCHHOFF.

Expressions from Many Manufacturers and Engineers on His Retirement from Active Editorial Work.

A large number of the friends of Charles Kirchhoff united in paying him a tribute of admiration and regard in a luncheon given at the Engineers' Club, New York, on the afternoon of January 16. To give Mr. Kirchhoff Godspeed on a West Indian cruise, following his retirement from the editorship of *The Iron Age*, was the immediate purpose of the gathering, but more especially it carried out a wish expressed by many of his friends in various organizations recently, for some public appreciation of his character and his long service as a technical journalist. The committee in charge of the luncheon was composed of Philip T. Dodge, president of the Engineers' Club; T. C. Martin, chairman of the Executive Committee, Museum of Safety and Sanitation; E. C. Brown, past president of the American Trade Press Association; Joseph Struthers, assistant secretary of the American Institute of Mining Engineers, and Theodore Dwight, secretary.



CHARLES KIRCHHOFF

Editor of THE IRON AGE from 1889 to 1909

Expressions of esteem and appreciation such as rarely come to workers in the fields in which Mr. Kirchhoff has exercised his talents marked the occasion. It will long be remembered by all who attended for its fine atmosphere of good fellowship and for the generous and spontaneous character of the tributes paid the guest of honor.

President Dodge of the Engineers' Club, in introducing the speaking after the luncheon, referred to Mr. Kirchhoff's retirement from active editorial work as the rounding out of a career of unusual distinction, to the great service he had rendered the Engineers' Club and other organizations, and to the important contribution he had made to the advancement of the industrial interests represented by *The Iron Age*.

Appreciation from Absent Friends.

Letters of regret were received from a number of Mr. Kirchhoff's friends who could not attend. Extracts from some of these were read by T. C. Martin. Among the writers were Dr. James Douglas, George S. Humphrey, Stevenson Taylor, Warren Delano, Willis E. Hall, Prof. Henry M. Howe, J. Langeloth, Felix A. Vogel, John Hays Hammond, Andrew Carnegie, Charles Whiting Baker, Fred E. Rogers, James H. McGraw, H. F. De Puy, J. W. Lieb, Jr., H. V. Conrad, A. G. Mills, John Thomson, New York; Robert W. Hunt, Chicago; Theodore N. Ely, Philadelphia; Hon. Wm. H. Wiley, Washington; I. N. Pardee, Hazleton, Pa.; Ambrose Swasey, Cleveland; H. G. Prout, Swissvale, Pa.; W. B. Cogswell, Syracuse, N. Y.; E. C. Felton, Philadelphia; Frank C. Roberts, Philadelphia; Edgar S. Cook, Pottstown, Pa.; F. Firmstone, Easton, Pa.; Hugh Kennedy, Buffalo; John Birkinbine, Philadelphia. Extracts from a few of the letters are given below:

E. C. FELTON: "It would give me much satisfaction to show my high regard for Mr. Kirchhoff as a man and my appreciation of his work in connection with iron and steel by being present at the luncheon."

I. N. PARDEE: "I have known Kirchhoff, I think, for about a quarter of a century, and never met him but I liked him more before I left him."

AMBROSE SWASEY: "I am glad that his friends have taken this opportunity to show their appreciation of the splendid work he has done as an editor, more particularly as relates to engineering matters. We can but feel glad that he is to take a much deserved rest for a time, but I am sure that upon his return he will still be deeply interested in engineering affairs and we will have the benefit of his years of experience and sound judgment.

CHARLES WHITING BAKER, editor of the *Engineering News*: "Charles Kirchhoff is the dean of engineering journalism. His work has been a source of inspiration to all of us for a quarter of a century. The engineering profession and the iron industry do well to show him honor."

JAMES H. MCGRAW, president of the McGraw Publishing Company: "Mr. Kirchhoff has indeed made a remarkable record as a technical journalist, covering a period of years, and has contributed in large measure to the great work of elevating the standard of technical journalism in the country and placing it on a firm foundation. At this time when Mr. Kirchhoff is withdrawing from his life work technical journalism occupies the center of the stage in the industrial activities of the country as never before. It is therefore most fitting that his hosts of friends should gather and do honor to the man who has done so much of permanent value in this important field of the world's activities."

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PITTSBURGH, PA.

ANDREW CARNEGIE: "It is a matter of deep regret that I am unable to attend the forthcoming dinner to our friend and fellow member, Mr. Kirchhoff. It is a long time, indeed, since we were first acquainted. I cannot but regret his retirement from *The Iron Age*, which set a high standard of journalism. On the other hand, both Mr. Kirchhoff and his chief are entitled to take it easy and from the pinnacle they have gained look around and down and moralize upon their successors, giving them a hand now and then, I hope. One of the greatest services a man can do in our day is to elevate the press, or we will compromise by saying that they should keep the press up to our friend's high standard."

JOHN THOMSON: "He is one of the men one likes to grow old with, but I am delighted that his friends are to have this foregathering that he may take with him in his journeyings tangible evidence, in this his buoyant youth, of our affectionate regard and respect, the outgrowth of his pleasing personality, his unselfishness and his high personal character and ability."

A Presentation.

George W. Cope, editor of *The Iron Age*, spoke from an association of more than a quarter of a century with Mr. Kirchhoff in editorial work, saying in part:

"From the time he assumed the responsibilities of editor in chief he displayed the power of a masterly brain in discovering and correcting weaknesses, in opening new channels of usefulness, in quickly perceiving the bearing of new developments in commercial or technical progress and in inspiring those around him with fresh zeal and interest in their work. As to his worth as a man, that was established from the start. Courteous to his subordinates, affable to his equals, considerate always, and actuated by the highest principles, he has needed no exemplar for his personal guidance.

"I never knew him to display more indignation than upon a memorable occasion after an interview with an applicant for a responsible editorial position then vacant. I was present at the interview. The applicant talked confidently of his literary accomplishments, evincing much pride in the facility with which he could write on either side of a question and expressing himself as ready at any time to advocate any policy that might be prescribed. The chances of that applicant immediately faded. Kirchhoff was too true to his own high ideals and principles to tolerate such an easy conscience in another. In his editorial management of *The Iron Age* no attempt was ever made throughout his long service to control his views or his opinions to meet developments in the business department. And I know the man so well that I say without hesitation his resignation would have been immediate if anything of the kind had been broached. But with Kirchhoff as editor in chief there was implicit confidence in his judgment and the tremendous growth in both the prestige and the business of the paper during his incumbency bears ample testimony to his ability and his wisdom."

Mr. Cope then presented to Mr. Kirchhoff, on behalf of his associates in the David Williams Company, a French bronze statue by Picault entitled "La Source du Pactole." Referring to the gift, its significance and the sentiments of the donors, the speaker said:

"It is emblematical of your profession, as well as of the cause in which you have so long employed your energies and your talents. The engineer, holding in one hand the dividers and in the other a hammer, contemplates the Pactolian stream, and as he muses we can well believe that he exults in the thought that his labor is also productive of wealth. How much and how effectively your labors have contributed to the material benefit of those who have for years used *The Iron Age* as an important factor in the conduct of their business is beyond my power to estimate. We trust that you will cherish this gift as a memento of the days spent with your old associates in the David Williams Company; but we assure you that if it were to represent many, many times its present intrinsic value the hight and depth and breadth of our regard for you would even then only begin to be measured."

The Bronze Statue, "La Source du Pactole," Bearing the Inscription, "Presented to Charles Kirchhoff, Retiring Editor of THE IRON AGE, by His Associates in the David Williams Company, January 16, 1910."

As Mr. Kirchhoff rose to speak his friends rose with him, applauding warmly. In his response, which showed much feeling, he referred to the auspices under which his work had been done—to the never failing backing of his chief and the co-operation of his associates. Following one or two personal reminiscences, he spoke of the laying down of editorial responsibilities as giving opportunity for effort in the advancement of some matters of public concern and suggested that on the testimony of some who had tried it, so-called retirement from active business sometimes involved a busier life than ever.

A Tribute by John Fritz.

John Fritz of Bethlehem, Pa., to whom Mr. Kirch-

LUNCHEON TO CHARLES KIRCHHOFF AT THE ENGINEERS' CLUB, NEW YORK, JANUARY 16. 1910

hoff had referred in one portion of his remarks, was sitting on the latter's right. In spite of his 87 years and more, the Nestor of the American steel industry had made the journey to New York to participate in the tribute to his friend of many years. As he rose in response to a call from President Dodge the whole company stood up and greeted him with heartiness. He spoke of Mr. Kirchhoff's first visit to the Bethlehem plant and of the care then taken to keep knowledge of certain features of the steel plant from the public. Some visitors the speaker went about with himself, to make sure that they saw just what he wanted them to see. Of the part contributed by Mr. Kirchhoff to the advancement of the American iron trade, Mr. Fritz spoke in high appreciation. In the 1840's pig iron production in the United States was less than 300,000 tons. In a recent year 27,000,000 tons was passed and now the country is producing at the rate of 32,000,000 tons a year. As editor of *The Iron Age* Mr. Kirchhoff had commented on developments in the industry year after year, described the best practice, analyzed the statistics of production, kept all in the industry informed as to the work of mechanical, metallurgical and electrical engineers in this country and abroad. The value of such information as given by a journal like *The Iron Age,* the speaker said, could not well be measured, "and," he added, "any man engaged in any way in iron and steel manufacture who doesn't read *The Iron Age* doesn't know his business." Mr. Fritz put emphasis upon the portion of Mr. Cope's remarks relating to Mr. Kirchhoff's fidelity to principle and the honesty and independence of his editorial administration. As the veteran engineer expressed his admiration of these qualities in his friend he was roundly applauded.

Dr. Rossiter W. Raymond, secretary of the American Institute of Mining Engineers, dwelt in terms of warm regard on Mr. Kirchhoff's personality and the work he had accomplished. He enlivened his remarks with allusions to the contest for the secretaryship of the Institute in 1885, when both were candidates, and of the firmer friendship that dated from that rivalry.

President Henry S. Drinker of Lehigh University, South Bethlehem, Pa., reinforced much that had been said of Mr. Kirchhoff's personality and of the influence quietly exerted by his career and its successes upon young men coming on in university life.

J. W. Cuntz, on behalf of the Alumni Association of Hoboken Academy, Hoboken, N. J., where Mr. Kirchhoff received some of his earlier training, presented the latter with resolutions of congratulation and regard passed by the association at a recent meeting.

The playing of "Auld Lang Syne" on the piano by Geo. H. Guy, who contributed several instrumental numbers in the course of the exercises, gave the final touch of sentiment to the occasion.

Those in Attendance.

The following were present at the luncheon:

T. C. Martin.
Geo. H. Guy.
W. H. Tolman.
Ed. A. Uehling.
A. S. McAllister.
E. E. Bartlett.
W. H. White, Jr.
Geo. W. Cope.
L. C. Holden.
Henry R. Towne.
J. Waldo Smith.
L. Vogelstein.
C. H. Zehnder.
A. Heckscher.
Colin C. Simpson.
C. M. Wales.
Charles E. Lydecker.
Joseph Struthers.
Theodore Dwight.
A. E. Vaughan.
P. T. Dodge.
Charles T. Root.
R. W. Raymond.
Henry G. Morse.
W. R. Ingalls.
Henry D. Hibbard.
H. M. Swetland.
James Gayley.
John S. Kennedy.
W. B. Kunhardt.
F. A. Halsey.
J. M. Wakeman.
A. R. Ledoux.
Wm. Schwanhauser.
F. S. Witherbee.
John B. Farish.
H. R. Cobleigh.
J. M. Sherrerd.
Prof. Jos. W. Richards.
G. F. Eldridge.
Albert W. Jacobi.
Robt. A. Cook.
W. L. Saunders.
E. G. Spilsbury.
Jesse M. Smith.
W. H. Taylor.
I. A. Mekeel.
W. W. Macon.
John B. Bennett.
O. C. Gayley.
Mr. D'Audiffret.
Wm. Kirchhoff.
Louis Raegener.
R. H. Wolff.
E. Zaiss.
P. Heroult.
H. C. Mable.
R. A. Franks.
C. F. Quincy.
R. U. Johnson.
J. E. Denton.
D. M. Riordan.
H. V. Winchell.
A. Eilers.
H. S. Munroe.
Walter Wood.
Knox Taylor.
Mr. Earnshaw.
Jas. E. York.
E. W. Parker.
David L. Williams.
Richard F. Williams.
Dr. David T. Day.
Henry S. Drinker.
John Fritz.
Calvin W. Rice.
James Bertram.
Fred W. Schultz.
Frank Klepetko.
J. N. Judson.
Robt. E. Jennings.
E. N. Jennings.
A. R. Shattuck.
C. I. Earll.
L. F. Braine.
Geo. A. Howells.
H. F. J. Porter.
Geo. F. Kunz.
Bradley Stoughton.
S. S. Webber.
E. C. Brown.
Wallace H. Rowe.
Chas. F. Rand.
Wm. H. Wallace.
Wm. H. Hulick.
Arthur Williams.
Alex. C. Humphreys.
Theo. Stebbins.
H. A. J. Wilkens.
W. H. Fletcher.
Geo. W. Maynard.
A. I. Findley.
J. W. Cuntz.
E. Henning.
H. W. Blake.
J. M. Goodell.
H. B. Chamberlain.
A. W. Kiddle.
Col. E. D. Meier.
H. H. Suplee.
Dr. Richard Moldenke.
Dr. E. F. Roeber.
J. B. Nau.
J. E. York, Jr.
J. P. Roe.
C. C. Cluff.
B. H. Locke.

The National Metal Trades Association and the Labor Question.

Commissioner Robert Wuest of the National Metal Trades Association makes some cogent remarks in his January *Bulletin* to the members, from which the following extracts are taken:

"On the threshold of a new year which holds every promise of being one of extraordinary prosperity, it is well for us to look carefully into the condition of our shops, so far as they affect the comfort and happiness of our employees. Indistinctly, and, as it were, from afar, we hear mutterings which indicate the restlessness of labor. These sounds will grow more loud and menacing as the year advances. We have heard nothing of this sort for several years; but, with increasing prosperity, the familiar sounds and signs recur as an indication of labor's desire for a larger share in the profits of its toil. To increase wages as the demand for labor increases is good business. That it is doubly good business when an era of great prosperity is at hand cannot be denied. Let us see of what use it is to increase the wages of our employees:

"1. It will keep them in our shops, instead of driving them into other shops.

"2. It will keep them contented and ready to work with hearty good will.

"3. It will keep our product up to the standard and practice of the times, because it will enable us to retain efficient workmen.

"Speaking generally, it is fair to say that the wise policy for manufacturers is to pay their employees the best wages that they can afford to pay. Voicing the sentiment which pervades the councils of the National Metal Trades Association, we wish to impress upon our members the importance of remembering this. The more it is remembered and practiced, the longer we will be immune from strikes and their consequences.

"The press of the country at this time is full of talk about the increased cost of living. The reasons assigned for this increase are many and varied; but the average writer seems not to be satisfied with the plain logic of the situation, but seems to be groping in the dark for some mysterious and ulterior cause. But be the reason what it may, the fact is undeniable that a dollar does not go nearly so far to-day as four or five years ago. It would seem, therefore, to be good business for all of our members to take to heart the foregoing advice on the wage question. Good wages; the proper education of employees—especially of apprentices; the adoption of practical and equitable profit sharing systems; these are the important factors in the solution of the labor problem.

"At the next meeting of our Executive Committee plans will be discussed for our next annual convention, to the end that it may be the most interesting and profitable ever held by our association. The convention will meet at the Hotal Astor, New York City, on April 13, and will continue two days. As usual, the convention will be preceded by a meeting of the Administrative Council."

LUBRICATION AND LUBRICANTS.—I*

Report of Tests Made at Case School of Applied Science.

BY CHARLES F. MABERY.†

Next to the conservation of the world's fuel supply there is probably no subject of greater importance in the manufacturing world than the control of waste power caused by imperfect lubrication and needless friction. Notwithstanding the increasing interest in more economical methods the immense losses from this source are scarcely appreciated. In his recent work on lubrication and lubricants Archbutt stated that of the 10,000,000 hp. in use in the United Kingdom of Great Britain, 40 to 80 per cent. is spent in overcoming friction, and considerable of this is wasted by imperfect or faulty lubrication. Abundance of cheap fuel in the United States doubtless makes the conditions even worse here, but it is safe to state that from 10 to 50 per cent. of the power employed is lost. Frequently

Fig. 1.—The Carpenter Lubricant Testing Machine Used in the Experiments.

in factories where the annual expense for lubrication amounts to thousands of dollars, lubrication experts find a loss of 50 per cent. or greater.

In the preliminary study of the conditions depended on for the results described in this paper, under such loads as 100 or 150 lb. per square inch of bearing surface, the ordinary grades of babbitt were found much too soft and yielding under the necessary conditions of speed and oil feed; only a very hard alloy could be used, and the one selected of approximately the composition, tin 90, copper 2, antimony 8, gave entirely satisfactory results. Then to maintain such conditions of load and speed that any oil could be broken down at any moment, it was found necessary, not only to machine the journal and bearing to mechanically true surfaces, but by continued operation and repeated machining to maintain a higher degree of permanent evenness. If such be essential in precise quantitative observations, similar precautions are evidently necessary in factory operations.

In the earlier days before the introduction of petroleum products, the manufacturer was little concerned with viscosity and other physical constants of lubricants, for dealing with simple oils or greases of definite composition, he could be sure of obtaining what he desired within the capacity of the materials available. Then manufactured products brought higher prices and competition was less severe than now; hence imperfect lubrication was of less consequence. Furthermore, at that time the principles of friction and the importance of its control were only imperfectly understood. Modern high speeds and excessively heavy loads had not then to be provided for in applications of power in manufacturing operations, transmission or transportation.

Heavy Lubricants.

The discovery that the heavy hydro-carbons in petroleum possessed the qualities requisite for lubrication—viscosity, durability, stability under varying conditions of speed and load—was the beginning of a new era in lubrication. Arbitrary methods of treatment and refining, with little or no knowledge of the hydro-carbons of which the lubricating oils were composed, were slow in producing suitable products. Even to the present no fundamental changes have been made except in the introduction of heavier hydro-carbons from crude oil territory more recently developed. Crude oils of the Pennsylvania variety containing a considerable proportion of the hydro-carbons $C_n H_{2n+2}$ have always yielded excellent light spindle oils composed for the most part of the hydro-carbons $C_n H_{2n}$ and $C_n H_{2n-2}$. But as we now know such oils have too little of the heavier hydro-carbons for the body necessary in lubricants for heavy loads and cylinder friction. This need led to compounding oils, or mixing with the petroleum products vegetable oils, such as castor or rape, and animal oils or greases, which so fully monopolized this field that manufacturers were wont to believe that no other products could answer. Even since the introduction of heavy lubricants from Texas and California petroleum, this belief persists, whereas, carefully distilled and treated, they are well adapted for bearings and cylinders and are now widely used.

Experimentors have realized that a solid lubricant embodying an equivalent of the desirable qualities of the liquid products with a greatly superior wearing quality, a low coefficient of friction, and readily convertible into a form that can conveniently be applied to the various forms of journals and bearings, would be ideal. Soapstone, asbestos, natural graphite, &c., do not entirely possess these fundamental qualities of the liquid products. Greases compounded with graphite are useful on low speed bearings and under heavy work. Natural graphite is excellent on cast iron bearings, acting as a surface evener of the porous metal. On finer surfaces care is necessary that it does not clot and scratch or abrade the journal and bearing. Graphite possesses the desirable unctuous quality and great durability. For general lubrication it must be very pure and finely divided. Whether in such as the deflocculated form the ultimate molecules or atoms have a freedom of movement, analogous to that of liquid molecules under stress of friction, or whatever may be the explanation, it is highly unctuous.

Graphite.

Dr. Edward G. Acheson of Niagara Falls has succeeded in converting graphite into a deflocculated form that meets the requirements of an ideal solid lubricant. It far surpasses ordinary graphite in unctuousness and its ability to remain suspended in water and oils, its readiness to form coherent films on journals, its great

* A paper presented before the American Society of Mechanical Engineers, in New York City, January 11, 1910.

† Professor of Chemistry, Case School of Applied Science.

wearing qualities and the ease of the application make it an extremely efficient lubricant.

Acheson graphite can be produced from any substance that contains carbon in a non-volatile form. At the high temperatures of the electric furnace all other elements are readily volatilized. Even carbon itself is freely vaporized and its pecular appearance in the burning carbon monoxide is employed to indicate suitable conditions in furnace operation. Both unctuous and deflocculated graphite are produced commercially; the first accompanies the production of carborundum in furnaces charged with carbon and sand, is leafy in structure, coherent and extremely unctuous or greasy in its feel, is segregated and not readily disintegrated, and the second is obtained from a charge of coal or coke alone, is also highly unctuous, but very pulverulent and capable of extreme subdivision. It is readily converted into a deflocculated condition and in water forms the commercial Aquadag, or aqueous deflocculated Acheson graphite. In combination with oils it is known as Oildag.

Deflocculated graphite has peculiar properties; it remains suspended indefinitely in water, but is quickly precipitated by impurities. On account of its extreme fineness a very small amount suspended in water serves for efficient lubrication. From numerous and long continued trials it appears that 0.35 per cent. is adequate and more superfluous. It is remarkable that such a small quantity is readily distributed by water between a journal and bearing, while sustaining a load of 70 lb. per square inch of bearing surface, and that under high speed conditions it maintains an extremely low coefficient of friction.

Bearing Materials.

Proper lubrication involves careful consideration of the metals composing the journal and bearing, since they have an influence even with the best lubricating film intervening. The materials commonly used include cast iron, steel and various bronze and babbitt alloys. In high speed work cast iron bearings must be used with extreme care. In the accurate adjustment necessary in machine testing of lubricants we have found it impossible to prevent injury to the journal when using a cast iron bearing, nor has bronze proved altogether satisfactory. Properly selected babbitt, however, on a steel journal seems most satisfactory and possesses a wide range of applicability. As mentioned before, satisfactory lubrication is possible only when the journal and bearing are properly machined to true surfaces, kept smooth, accidental scratches worked out and bare spots avoided. Successful lubrication demands constant skilled attention to the condition of journals and bearings, and no factory supervision affords more desirable returns. Lubrication consists in reducing friction to the lowest percentage of the power used. A lubricant is an unctuous body that readily forms a continuous, coherent, durable film capable of holding apart rolling or sliding surfaces, and itself interposing the least possible resistance. The economic problem in lubrication depends on the use of such lubricant under suitable conditions.

Lubricants Classified.

The lubricants in commercial use are water, oils, greases and solids. Oils include light spindle, heavy engine and cylinder products, either unmixed hydrocarbons from petroleum or compounded oils—mixtures of the petroleum hydrocarbon with some one of the vegetable oils, or with animal oils, tallow, wool greases, &c. The greases may be generally classified under a few heads, depending on their consistency, which is derived from the proportion of lime or soda soaps or oleates mixed with the hydrocarbon oil as a carrier. The solid greases have already been referred to. Water possesses no oiliness whatever, but under certain conditions in cylinders is found to assist in making the surfaces extremely smooth, which serves to materially reduce the friction. A practical knowledge of hydrocarbon lubricants should include a knowledge of the crude oil from which it is prepared, since those from different fields differ widely in composition and properties. Methods of refining have much to do with the quality of the products. In general inferior products are obtained when the distilling process produces decomposition; the best products are obtained only by processes that leave their hydrocarbons essentially the same composition that they had in the original crude oil. Examination of various lubricants frequently reveals improper refining. Simple tests will show the presence of free alkali, of sodium sulphate or of sodium salts of organic acids, all of which may be injurious to metallic surfaces. One of the refiner's most exacting tasks is the treatment with caustic soda to remove acid products without introducing an excess that will form an emulsion. The best refined oils are those that contain a minute trace of alkali.

Lubricant Tests.

The ordinary lubricating oil tests include determinations of viscosity, specific gravity, and flash and fire temperatures. Another important property, oiliness or greasiness, is not so readily determined by analysis; there seems to be no accurate method, yet it is readily distinguishable and has much to do with the efficiency of all lubricating oils. Authorities differ on the most efficient methods of testing lubricating oils. Redwood in his work on petroleum and its products asserted that viscosity is the best guide to lubricating value, since it enables the consumer to select oils similar to those that have afforded him the best practical results. He alludes to the close relationship between viscosity and the laws of friction of liquids. He was unable to obtain satisfactory results with any friction testing machine at his disposal and concluded that their indications are misleading. Referring to Thurston's opinion that any oil should be tested on a machine under conditions of load and speed similar to those of its intended use, he cited the lack of agreement between the work of Ordway and Woodbury in 1884 with an apparatus constructed to apply pressures of 40 lb. per square inch, and that of Tower carried on under what he terms great pressures, 100 to 600 lb. per square inch, in an oil bath system of lubrication, and opinions of others on these results, to show that conditions of actual practice are not approximated, hence his conclusion that viscosity affords the most valuable tests of lubricating qualities at our disposal. Redwood's opinion, however, is a result of his observations during several months on Ingram and Stafer machines, in which the speed is 1500 rev. per min. and the friction is gauged by the number of revolutions necessary to carry the temperature to 300 degrees F.

The value of viscosity as a distinguishing property of lubricating oils is recognized, but all do not agree as to the extent of its practical reliability. Archbutt suggests that the quality of oiliness or greasiness is of nearly as much importance as viscosity. Although there is no precise measure of oiliness, it is easy to recognize it and distinguish marked differences in different oils and greases. Archbutt calls attention to the fact that at very low speeds the friction of a journal should be proportional to the viscosity of the oil, but at higher speeds, and consequently increased temperatures, the relation of friction to speed ceases, and the viscosity is diminished with a corresponding change in the carrying power of the journal. While fully appreciating the value of information obtained by chemical analysis, Archbutt insists that the oiliness is of especial importance under heavy loads and high speeds. He suggests that it is advantageous for an engineer to test oils for himself on a machine without depending altogether on analytical data of physical tests obtained from an expert.

Hurst also mentions that a broader knowledge of the practical working of oils is necessary than can be obtained from chemical or physical tests alone. He maintains that the test of an oil from a journal under the practical conditions of its use shows conclusively its adaptability to such use.

The Carpenter Lubricant Tester.

The principal points to be observed in mechanical tests are the effects of speed, load, temperature and the frictional effects due to viscosity and oiliness; the measurements on which the quality of the oil depend include the frictional resistance, the temperatures and the endurance of the oil film. Doubtless the numerous machines constructed for testing oils have certain merits and advantages. In the wide range of work carried on in this field during the past year, a part of the results of which are presented in this paper, the machine devised by Professor Carpenter, Fig. 1, was used. In its sensitive adjustment, durable efficiency and the wide range of possible tests this machine in continuous use during this period on light and heavy oils, greases and graphite has fulfilled all requirements. This machine has an accurate adjustment for recording the speed, and a long lever arm with a vernier attachment graduated to tenths of a pound for recording the friction. The load is applied by a powerful spring worked by a cam and lever, and the limit of the machine is 6000 lb., total load. Careful calibration of the spring showed it to be properly adjusted.

The projected area of the bearing used is approximately 8 sq. in.; the journal is about 3 in. in circumference and nearly 1 ft. long. A cast iron frame babbitted and machined to a true surface was used for most of this work. Even after careful machining some continuous frictional work was necessary on the babbitt surface to bring it to the proper conditions of constant results. The hard form of babbitt mentioned before gave satisfactory results, and there was little difficulty in keeping the surfaces in suitable condition after they were once obtained. A thermometer was inserted in a hole in the bearing which extended close to the journal. Tests made at steam temperature, 210 degrees F., were carried on in a hollow cast iron babbitted bearing with steam attachments, by which the desired temperature could readily be maintained. The lubricant was run in from a sight feed cup through a small hole close to one side of the bearing, with careful regulation of the flow for proper adjustment of the oil feed. To deliver the lubricant over the entire face of the bearing two channels or grooves are run diagonally across the babbitt face from the inlet hole, which gives equal and even distribution; these channels must be carefully gauged for an even flow, otherwise dry spots or streaks appear on the journal accompanied by a sudden greatly increased friction indicated on the friction bar. This detail of operation requires careful and constant attention, for on it depends the continuous regularity of the friction curve. Partial exposure of the journal enables observing the formation of the film, its comparative thickness and any irregularity due to an imperfect journal or bearing, or improper lubrication.

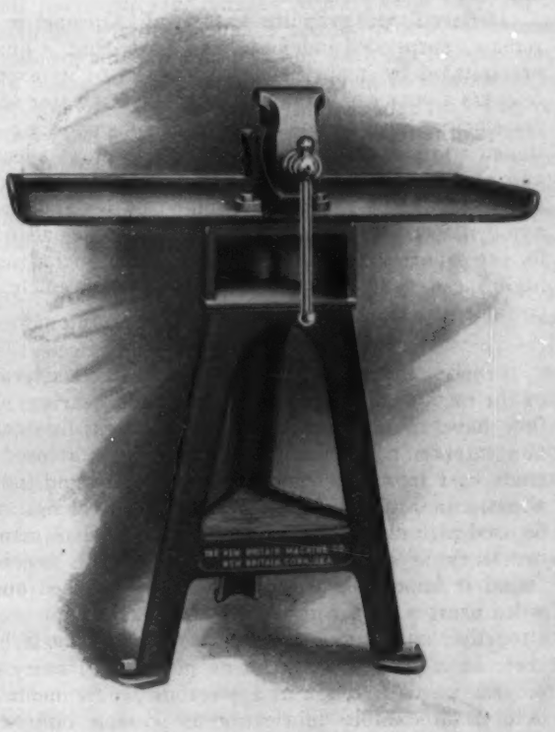
(To be continued.)

The Trademark Title Company, Fort Wayne, Ind., which has been in operation over two years, is developing the trademark field in this and foreign countries. A complete indexed file is kept of all registered marks, now numbering over 76,300. The company is prepared to design, register and protect trademarks and announces the assurance of the Patent Office that no one else in the country is so well equipped for the service. It undertakes the registering of marks, as well as the conduct of trademark contests. The purpose of the company is to build up a bureau containing all that is knowable about trademarks, which will be at the service of the trademark owners of the country. It is incorporated under the laws of the State of New York, with its business office at Fort Wayne, Ind., and its legal office at 60 Wall street, New York.

The New Britain Vise Stand and Bench.

A useful combination for chippers, filers, erectors, pipe fitters, architectual iron workers and safe makers has been brought out by the New Britain Machine Company, New Britain, Conn., and is illustrated herewith. The fixture consists of a 5-in. vise mounted on a rigid tripod base, either with or without the tray or bench top shown, which measures 20 x 40 in. and encroaches very little upon the available floor space of the machine shop, roundhouse or assembling room where it is installed.

The vise stand is a unit that is ready for service as soon as attached to the floor. Screwed fast in position it rests squarely and firmly upon the floor, regardless of any unevenness. The vise can be of any type and size up to 5 in., and the stand is rigid and strong enough to allow of any chipping or bending that should be attempted in a vise of that size. If a swivel base model is used a binder for locking the base operates in the pocket at the front and top of the tripod, while with a pipe vise the shelves in the bottom of the tripod and the pocket form convenient receptacles for threading dies, pipe cutters or tongs.



A Combination Vise Stand and Bench Built by the New Britain Machine Company, New Britain, Conn.

It is believed that the whole construction is stiffer than any that could be obtained by any other distribution of the same amount of metal, as there are no joints in the frame to work loose. The whole is very compact and the complete weight only 375 lb.

E. N. Breitung & Co., Rockefeller Building, Cleveland, present in a new pamphlet the expected analyses of their Marquette ores for the season of 1910, based upon shipments in 1909. The list includes 2 Bessemer, 11 non-Bessemer and 5 siliceous ores. The Foley Bessemer ore contains 58.858 per cent. iron natural, 7.50 moisture, 0.0166 phosphorus, 5.22 silica and 0.006 sulphur. Foley No. 2 contains 50.29 per cent. iron, 0.025 phosphorus and 6.00 moisture.

The New York Automobile Shows.

From the two annual automobile shows held in New York City, one at the Grand Central Palace from January 3 to 8, and the other in Madison Square Garden January 10 to 15, it is evident that automobile design and construction have practically become standardized. The 1910 models of various builders show fewer changes than those of any previous year; most prominent in the cars shown in both shows were more luxurious bodies and refinements in the details of the mechanism tending to higher efficiency. In general now the rank and file have joined the pioneers in the use of longer chassis and larger wheels.

The Palace show has usually been made up entirely of exhibitors outside of the Association of Licensed Automobile Manufacturers, but this year the number now in the association, some fifty, was greater than could be accommodated at the Madison Square Garden show, and consequently 17 of them obtained spaces in the previous week's show. Many have predicted that automobiles would become cheaper as more manufacturers entered the field, and to a measure this prophecy has been fulfilled in years gone by. But it would appear now that substantial, reliable machines have nearly reached the minimum limit of cost. Heretofore the licensed makers have shown little interest in moderate priced machines, but at the Garden show this year there was one model shown, the Flanders runabout, for $750. The cheapest car at the Palace show was one for $485. The highest priced cars were $6500 at the Palace show and $7500 at the Garden show. Instead of a tendency to still further reduce automobile prices, most makers have somewhat advanced this year, models corresponding to similar ones of last year being often $50 or even $200 higher than formerly. As an excuse for this there is generally furnished a more complete equipment, including for example a magneto, gas tank, gas lamp, rumble seat, larger tires or a more powerful motor.

In bodies, one of the newer types shown is that known as the Torpedo. It is of a form which lessens the wind resistance, causes less dust to be raised and affords greater comfort, particularly through the longer wheel base now generally provided. The largest car shown was a Thomas, carrying eight passengers. Numerous five, six and seven passenger models were also on exhibition, and in the commercial vehicles, which were more in evidence than ever, the largest was one of five tons capacity.

The American-La France Truck.

Interesting among the trucks was one too late to obtain space in either of the shows and consequently forced to exhibit in the streets outside, the new truck built by the American-La France Fire Engine Company, Elmira, N. Y. This company is known best as a builder of steam fire engines and heavy rolling stock for fire departments, in which business it has been engaged for over 45 years. It was natural that the company should have become interested in the building of heavy commercial trucks, and in the one, the first model of which has just been completed, the Manly hydraulic transmission described in *The Iron Age* December 10, 1908,* has been applied. The essential features of this drive are a pump with three radiating cylinders directly driven by the engine and two motors similar in construction to the pump, arranged to drive the two rear wheels. The motors and pump are connected by a closed circulating piping system, the discharge from the pump being passed through the motors and returned. The pump is arranged to give variable stroke, so that, running at constant rotative speed, the volume of its discharge may be varied from zero to maximum, giving corresponding speeds to the motors and in either direction. With the pump set to give no discharge the motors are positively held and constitute in themselves the brake. In addition to the steering wheel there is but one lever with which the operator is concerned; this gives variable speeds forward and reverse with a continuous range, *i. e.*, not by steps. When the speed is set at zero the machine is held against motion, even on a very considerable incline. The importance of such a simple control on a heavy truck can hardly be exaggerated, and the fact that an ordinary truck driver and not necessarily a chauffeur is competent to handle it also lends to its value.

The American-La France truck is very substantially constructed and powerful in all of its details, as may be judged somewhat from its dimensions and specifications. The motor is a four-cylinder, four-cycle vertical type, with 5½-in. bore and 6-in. stroke, and according to the A. L. A. M. rating has a capacity of 48 hp. It is water cooled, and is lubricated by a special mechanical oiler. The ignition is by jump spark, with a high tension magneto. The transmission system eliminates the need of clutch change gear, and differential gear, and the drive is from the motor through double chains. The wheel base is 120 in.; the chassis is 14 ft. back of the driver's seat, and has a width of 68 in.; the tread is 66 in. The machine weighs 7700 lb., has a capacity of five tons and is sold for $5000

Motors.

Among the pleasure cars shown at both shows, the four-cylinder motor was found on more than half of the makes represented. The remainder were nearly all six-cylinder models, with very few exceptions, which were of two-cylinder pattern. The two-cylinder motor may practically be said to have become obsolete. While some still cast their cylinders separately, and a few *en bloc*, it is the rule to cast the cylinders in pairs. Only one car still retains air cooling, and it also is one of the few now using wood in the frames. Another tendency in motors is to use those of higher power. This year the smallest shown was of 18 hp. and the largest 72; 30 and 40 hp. cars were the most common. The smallest cylinder sizes were 3¾ x 3¾ in. and the largest 5¾ x 5½ in., and the most popular 4¼ x 4½ in.

Other Features.

As compared with foreign makes, American cars are conspicuous for the absence of sloping bonnets, it being the almost invariable practice in this country to put the radiators at the front of the bonnet. Also almost universal is the construction of the frame of steel of channel sections. This year the frames in nearly all cars have been made somewhat heavier and stiffer. The largest wheels used on any car had a diameter of 42 in., and the smallest 30 in.; 36-in. wheels were perhaps most common. Many of the makers are now furnishing wheels with demountable rims, so that spare tires may be carried inflated and substituted for punctured ones very quickly and without deflating. Several furnish detachable tires as well as demountable rims, to enable tire repairs and changes to be made as expeditiously as possible.

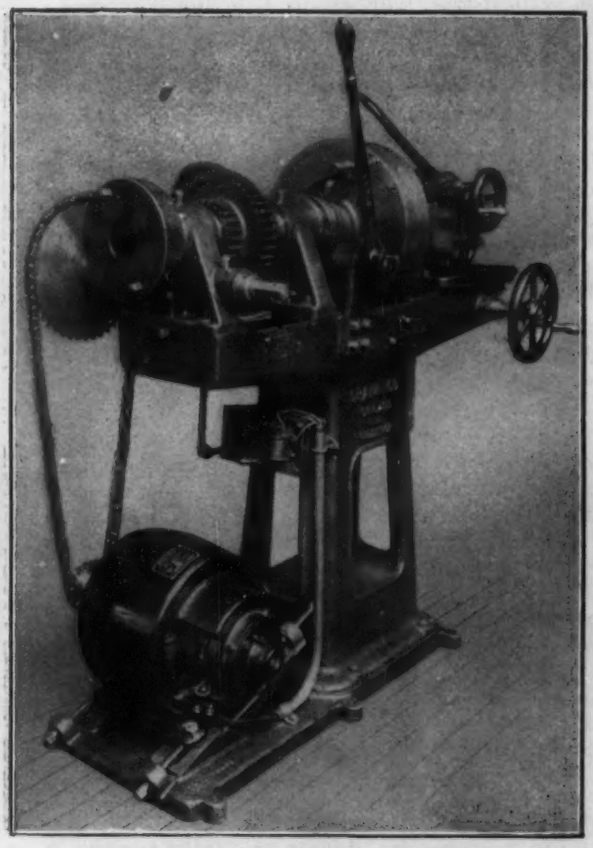
Provisions for greater accessibility and more nearly automatic operation are other notable trends in the machines exhibited this year. In many the fan behind the radiator can be taken off, and the water pump examined without removing the radiator, and the magneto is easily removed and replaced. The force feed system of lubrication is the one most frequently seen, although there are also numerous examples of the other two common ones, self contained and splash systems. Very largely oilers on the dashboard have been done away with, and the most approved systems are those circulating the oil by air pressure from the crank case, or placing the mechanical oiler box on the rim of the crank case.

* Efficiency tests of the Manly drive were reported in *The Iron Age* January 21, 1909.

The Crane Combination Hand and Power Pipe Machine.

With the latest pipe machine manufactured by the Crane Company, Bridgeport, Conn., known as the No. 1¼, pipe may easily be cut and threaded by hand or by simply removing the crank the machine is ready to operate by power. Pipe can be cut and threaded of sizes from ⅛ to 2 in. diameter inclusive, and bolt dies can be furnished in sizes ranging from ¼ to 1½ in.

The main frame, consisting of the base and bed, is cast in one piece, and it is stated is exceedingly rigid. It also has the advantage of a solid, compact arrangement, occupying the minimum of floor space. The



The No. 1¼ Pipe Cutting and Threading Machine Built by the Crane Company, Bridgeport, Conn.

driving mechansim is very simple. Only one belt is used, and with change gears operated by a single lever three changes of speed are available.

The die head, which is rigidly attached to a movable carriage, is equipped with plates to hold the different dies and also supports the cutting-off tool. The adjustment of the dies is effected by a single screw operated by a hand wheel. The dies are of an improved adjustable type so designed as to render the most efficient service when used on either steel or wrought iron pipe, are interchangeable, and can be easily removed and used in the No. 1 and No. 3 hand stocks made by this firm. Should one die of a set be damaged or broken it can be replaced, making it unnecessary to buy an entire new set of the size required. The change from one size to another is quickly made as when a single bolt is loosened, the dies can be removed and a new set inserted. By the adjustable feature pipe can be threaded to meet the most radical differences that might occur in the tapping of fittings, and by a simple locking device the dies can be set so as to maintain the desired size for duplicating any number of pieces.

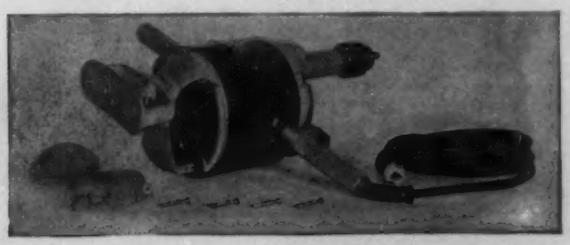
The gripping chuck is very powerful and is operated by a lever. The pipe can be either locked in the chuck or released without stopping the machine, as the entire capacity is covered without a change of jaws. These jaws are of tool steel carefully tempered, are carried in steel holders and are removable. The rear end of the spindle carries a universal centering chuck that is easily adjusted to the various sizes of pipe handled by the machine.

The very essential feature of the lubrication of the dies is well provided for by a small rotary oil pump placed on the back of the machine. This gives a copious flow of oil, and the supply to the dies is controlled by a pet cock.

To provide for motor drive a subbase with a motor plate can be placed under any of the No. 1¼ machines. The electrical equipment consists of a ¾-hp. motor with the usual controlling devices. The power is transmitted from the motor to the machine by a chain and sprockets.

A New G. E. Portable Electric Drill.

The direct current portable breast drill designed by the General Electric Company, Schenectady, N. Y., has met with such favor, and so satisfactorily demonstrated its ability to do the work required of it that an alternating current one designed for operation on 110 or 220 volt, 60-cycle circuits is now being manufactured. This new drill possesses all the operating features of



A Portable Alternating Current Drill Manufactured by the General Electric Company, Schenectady, N. Y.

the direct current model, and may be used where alternating current only is available. As will be judged from the accompanying illustration, it has the ruggedness necessary to withstand the hard usage incidental to its service, yet the weight is small, 21 lb., insuring a device that may be handled by one person easily and rapidly. Two knurled side handles and a breast plate provide means for holding it securely in any position.

For stopping and starting the motor an indicating control switch is conveniently located near the right handle, so that it can be operated by that hand without releasing the grasp on the handle. This feature, it is stated, makes the control of the apparatus so simple that the operator's entire attention may be given to the drill. Hand holes afford easy access to the commutator, and the brushes for inspection or repairs.

The drill is equipped with a Jacobs chuck, manufactured by the Jacobs Mfg. Company, Hartford, Conn., which will take drills up to ⅜ in. in diameter. Some idea of the saving of time made possible by its use may be gained when it is stated that a ⅜-in. hole 1 in. deep can be drilled in cast iron in 27 seconds, and in machine steel in 95 seconds. This is quite a contrast with the time required to move heavy castings to a stationary drill, make the necessary adjustments, drill one hole, readjust the casting, and drill another hole, repeating this process as many times as there are holes. Generally a crane will be required necessitating the services of several men in addition to the one operating the drill. On the other hand, a portable drill is brought to the casting, the attachment plug is screwed into the nearest lighting socket, and the work is done by one person in a few minutes.

Evading Canada's Customs Duties.

TORONTO, January 15, 1910.—Representations were recently made to the Canadian Customs Department that the customs act was being violated by Canadian railroad corporations. The companies were accused of abusing the privilege allowed in respect to foreign owned cars entering Canada in the ordinary course of traffic. Such cars are duty free, the presumption being that they are engaged on this side of the line in strictly international traffic. It is alleged that cars coming into Canada in this way have been kept by Canadian railroad companies and regularly employed in purely internal transportation. It was stated in particular that steel cars carrying coal into Canada have been retained to haul ore between points in this country. The complaints were made by representatives of the new car merger and of the Canadian Manufacturers' Association. They asked that the Minister of Customs establish a checking bureau for the purpose of stopping the practice. He did not promise to do this, but gave assurance that the grievance would receive his attention.

Irregularities in the Customs Office at Winnipeg lately led to the retirement or transfer of some appraisers there. It has been found that a number of automobiles came through that customs port last year at valuations much below the market price. Government customs agents, having got wind of the matter, suddenly pounced upon certain of the importers and confiscated five automobiles. Four of these were summarily sold, and the fifth was recovered after the payment of a considerable sum in satisfaction of the Government's claims.

Complaints have lately been made of evasions of the anti-dumping clause of the tariff. Precautions for the detection of such frauds have been increased. A new form of declaration has been supplied at customs offices for all importers of goods represented as entitled to admission at preferential tariff rates.

C. A. C. J.

Machinery and Supply Trades Curves.

The fluctuations in the machine tool and supply trades during recent years are graphically told in the accompanying charts. A great territorial difference in conditions arose during 1909, because of the enormous buying of the automobile trade, which was done chiefly through the dealers of the Middle West, sending their sales to a point far higher than that of their Eastern contemporaries. Therefore to employ the illuminating assistance of the chart to tell the story of the year in comparison with its predecessors it was necessary to obtain different curves.

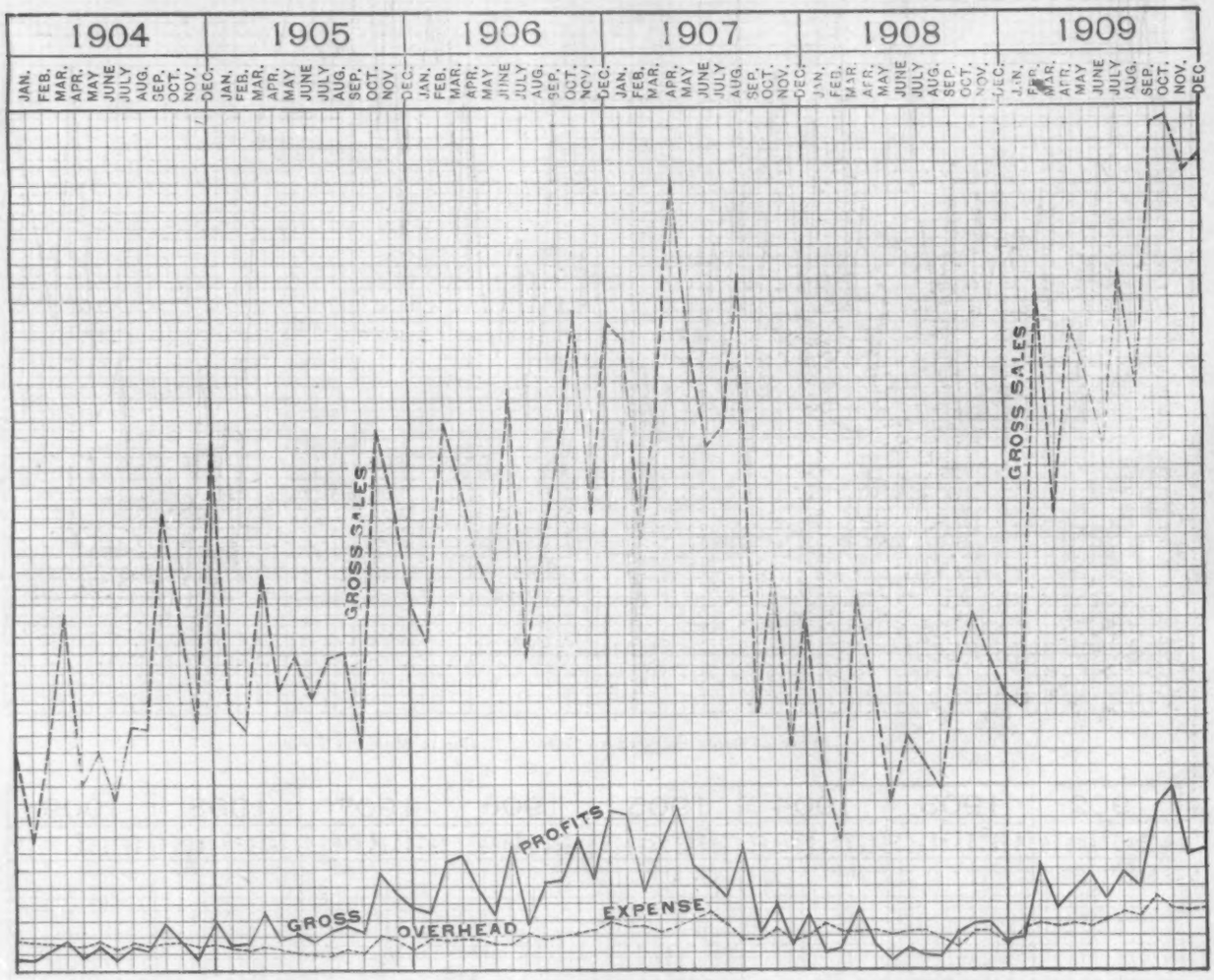


Fig. 1.—Curves of Gross Sales, Gross Profits and Overhead Expense Plotted by a Prominent Machinery Dealer of the Middle West.

Fig. 1 is the chart kept for years by a prominent dealer of the Middle West. Fig. 2 is the curve of gross sales of an Eastern house which handles machine tools practically exclusively, while Fig. 3 is the curve of a concern prominent both in the machine tool and supply trade of the East.

It will be noted in the Western curve that the gross sales reached a mark last autumn above the maximum of 1907, which had been a record in the trade. However, excepting in degree, the three charts are practically identical. In each case business took a start about the first of the year, and then suffered slight depression, which reached its maximum about March 1. Then came a first rate spring business, culminating, as usual, early in May. The summer brought

something of a slump, though one less pronounced than usual. It ended early, the line beginning to ascend before the dog days had ended. From then almost to the close of the year the increase in business has been constant, both East and West. A glance at the curves shows the end of the hard times. The difference between the two latter curves is, in the machinery trade, the net profit or loss. The year began with a brief period of loss, followed by profits which, in the average, increased constantly. A noteworthy fact is the increased overhead expense, an item which does not vary to the same extent as sales, but one

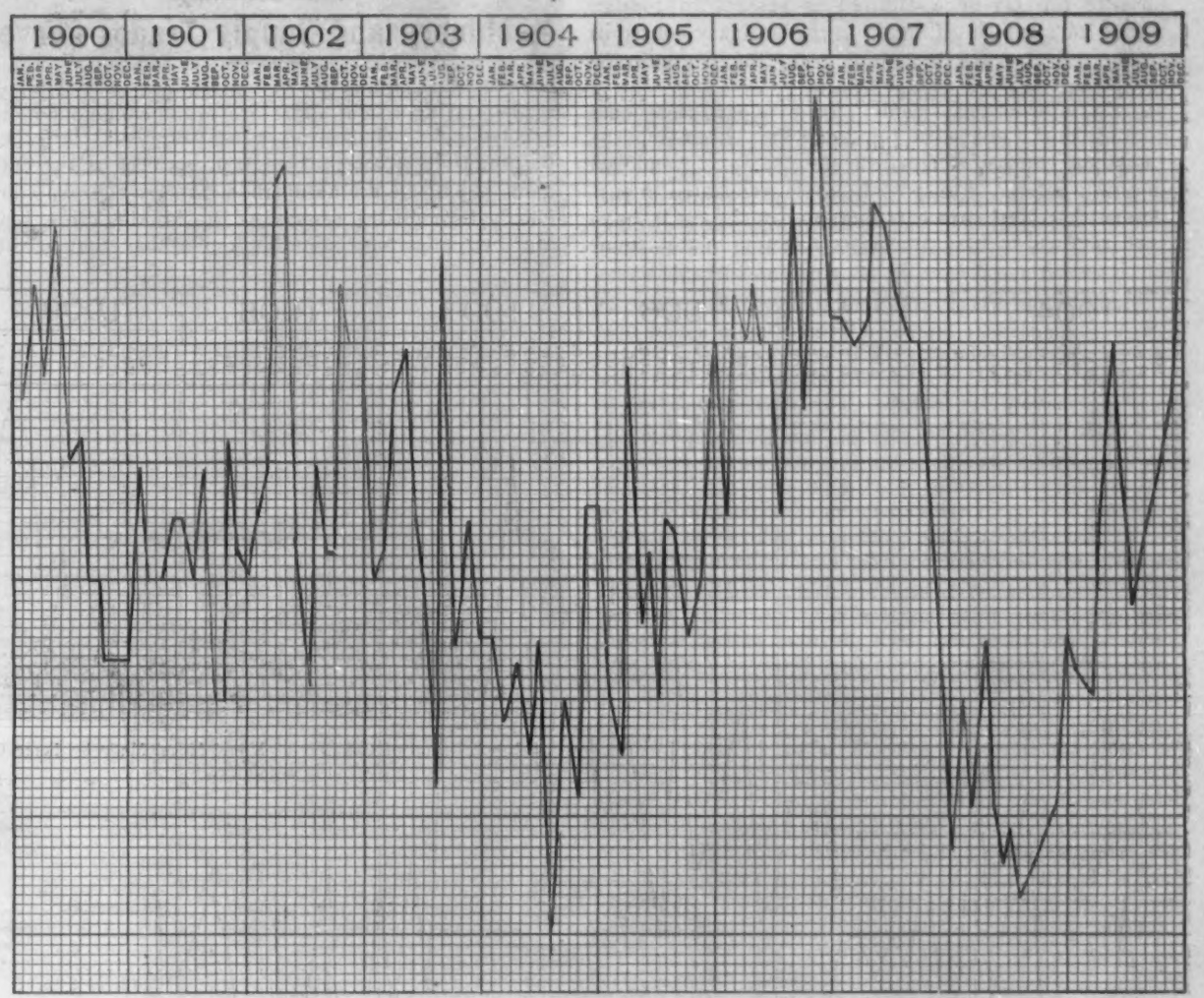


Fig. 2.—Curve of Gross Sales of an Eastern Dealer in Machine Tools.

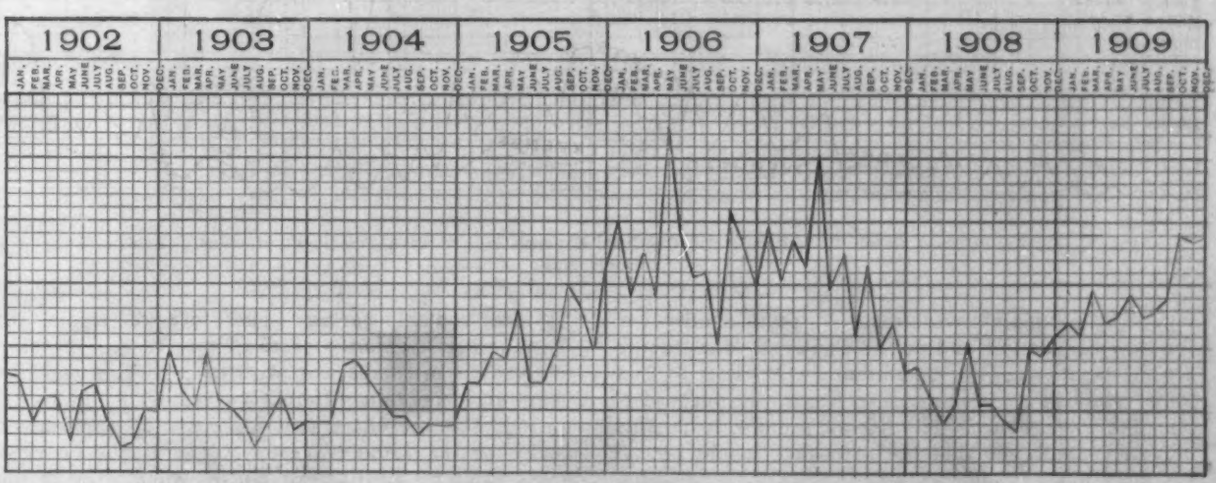


Fig. 3.—Curve of Sales of Another Eastern Dealer Handling Machine Tools and Supplies.

deeply depressed line has ascended to what is at least a normal level. The closing months of 1909 indicate clearly the approach of a season of maximum demand for machinery and supplies, a condition already realized in the West.

Fig. 1 contains interesting information concerning gross and net profits and overhead expense, in connection with gross sales. The upper line is the curve of gross sales, the middle line the curve of gross profits and the lower line that of overhead expense. The which must respond to a greater or less degree with the condition of the market.

The United Steel & Iron Company, Coffeyville, Kan., recently incorporated to erect a plant for manufacturing steel sheets, rods, bars and railroad spikes, states that on account of unfavorable weather the actual work of erecting the plant has been delayed, but it hopes to have work under way in the near future.

Monel Metal Castings.

An industry that appears to have wide possibilities is the making of Monel metal castings, which is now past the experimental stage and is being successfully accomplished in at least three foundries in New York and New Jersey. Monel metal is a non-corrosive alloy recently introduced by the Orford Copper Company in whose physical properties much interest has been shown. Its composition is approximately 68 per cent. nickel, 1½ per cent. iron and the balance copper, these being the proportions in which the elements exist in the ore. The ore is one that was unprofitable to work for the production of nickel on account of the cost of separating out such a high proportion of copper, but it was eventually discovered that the smelted but unrefined metal gave an alloy of considerable value in itself. It is tough and strong, much the same as nickel in appearance, and if anything has a softer and more attractive color.

Since the discovery of Monel metal it has been used extensively for sheets. The American Sheet & Tin Plate Company has marketed a great deal of it. Experimenting was done in the making of castings, but the first successful work was done by Isaac G. Johnson & Co., in their foundry at Spuyten Duyvil, N. Y. For the last two years they have been producing ship propeller castings and of late have gone into the manufacture of a larger variety of Monel metal castings. This line includes boat propeller wheels, rudders, centerboards, deck fittings, water ends of pumps, linings, valves, plumbing fixtures, shafts, piston rods, valve stands, crank shafts, pipe connections, forgings and the like. Examples of many of these products are shown in Figs. 1, 2 and 3. Most notable for their size were two Monel metal propeller wheels, each measuring 13 ft. in diameter and weighing 15,000 lb., shown in Fig. 4. This metal is especially valuable for propeller wheels and other parts that come in contact with salt water because of its non-corrosive properties. It is also particularly valuable for pump linings and pump rods. Some of its physical properties are given in the following:

Navy Department Specifications.

Navy mixture No. 1, for rods, tubes and similar material.

Pieces having a thickness of less than 1 in.:

Tensile strength, pounds per square inch	90,000
Elastic limit, pounds per square inch	60,000
Elongation in 2 in., per cent	25

Cold bend of 180 degrees about an inner diameter of 1 in.

Pieces having a thickness or diameter of 1 in. and over:

Tensile strength, pounds per square inch	80,000
Elastic limit, pounds per square inch	50,000
Elongation in 2 in., per cent	30

Cold bend of 180 degrees about an inner diameter of 1 in.

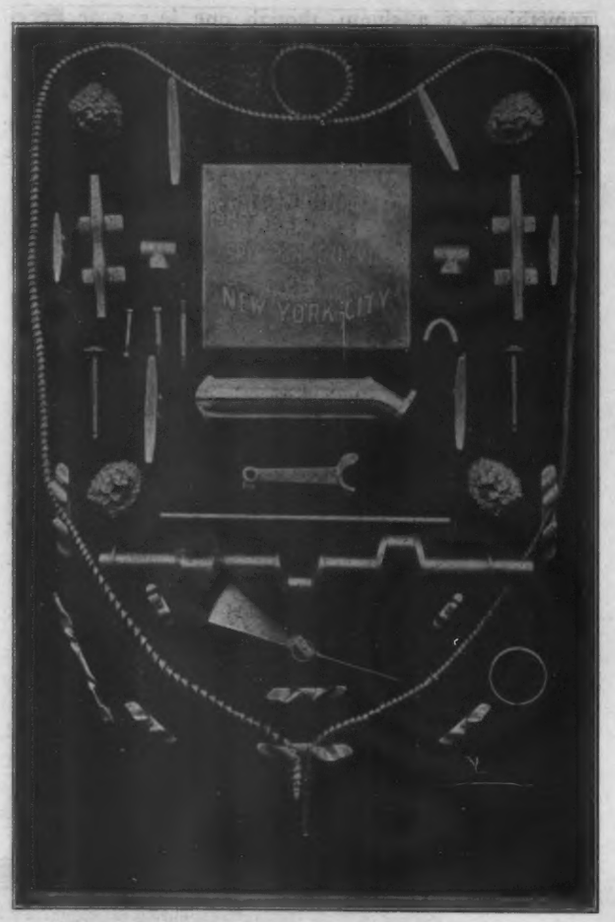


Fig. 1.—A Group of Castings of Monel Metal Made by Isaac G. Johnson & Co.

Pieces having a thickness or diameter of 2 in. or more:

Tensile strength, pounds per square inch	80,000
Elastic limit, pounds per square inch	45,000
Elongation in 2 in., per cent	30

Cold bend of 180 degrees about an inner diameter of 1 in.

Navy mixture No. 2, for castings and similar material.

Tensile strength, pounds per square inch	66,000
Elastic limit, pounds per square inch	33,000
Elongation in 2 in., per cent	25

Cold bend of 180 degrees about an inner diameter of 1 in.

Melting point, 1360 degrees C. (2480 degrees F.).

Specific gravity (cast), 8.87.

Weight per cubic inch, 0.319 lb.

Coefficient of expansion (20 degrees C — 100 degrees C.), 0.00001375 per 1 degree C.

Electrical resistivity, 256 per mil-foot (temp. coefficient, 0.0011 per 1 degree F.).

Electrical conductivity, 1-25 that of copper.

Heat conductivity, ⅛ that of copper.

Modulus of elasticity, 23,000,000.

Shrinkage, ¼ in. per foot.

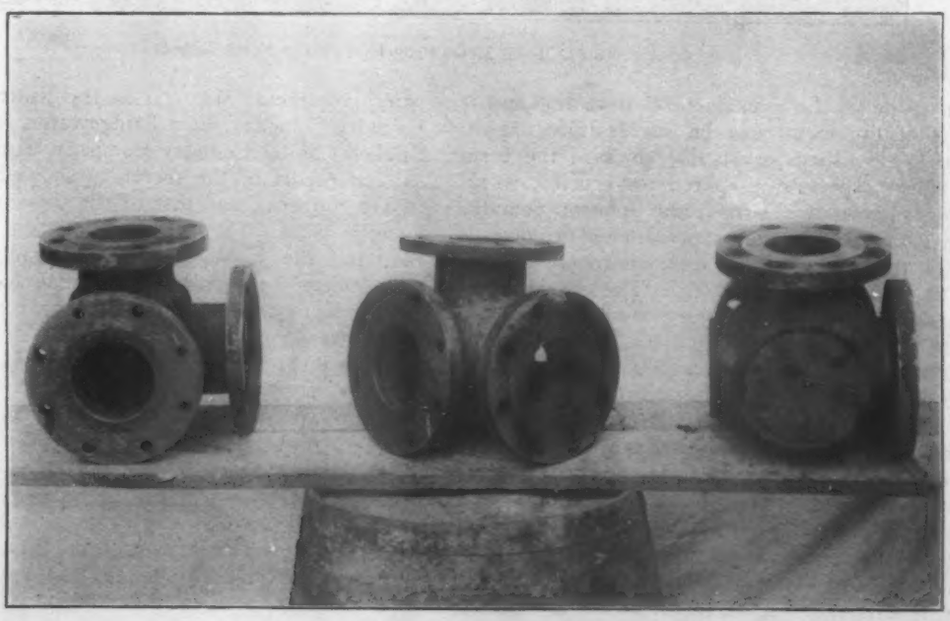


Fig. 2.—Three-Way Gate Valves with 5-In. Openings.

Fig. 3.—Two 7-Ft. Monel Metal Propellers.—The one at the right was subjected to a drop test of 21 blows from a 4000-lb. ball falling 25 ft.

It can be seen that the metal is somewhat tougher than mild steel, but nevertheless it machines very easily. A lathe can be run at the same speed on Monel metal as on mild steel and the metal can be soldered, brazed or electrically welded. Under the supervision of the Johnson foundry, where notable success has been achieved in casting this metal, some experiments have been made in the manufacture of tubing and it is stated that the metal can be successfully drawn. The metal is furnished as crucible stock in the form of small blocks especially prepared for crucible work. Clay lined crucibles are used at the Johnson foundry and when charged with the proper amount a cover is placed over the crucible. No flux, charcoal or other material is added while melting. The metal melts rapidly and can be raised to a high temperature without injury. The proper melting temperature is a little higher than for cast iron (about 2480 degrees F.).

For especially large melts Monel metal is melted in an oil burning reverberatory furnace holding from 3 to 10 tons, according to design. The metal is tapped into ladles or crucibles and the practice for smaller melts described above is then followed. It can be cast either in dry or green sand molds on the same general plan as casting manganese bronze. As the melting point of this metal is higher, the sand selected should be of a nature to stand this heat. It is especially desirable to have a sand as high in silica as possible and free from oxide of iron or lime. The same process as is used in polishing brass is required to finish the metal and when polished it can be utilized to good effect in the place of nickeled parts. For exposed working parts of machinery where a high finish is desirable for decorative purposes the metal is particularly suitable. Castings can be made for 25 to 40 cents per pound, depending upon form and dimensions. The Riverside Steel Casting Company, Newark, N. J., and the Bayonne Casting Company, Bayonne, N. J., are two other foundries that now make Monel metal castings.

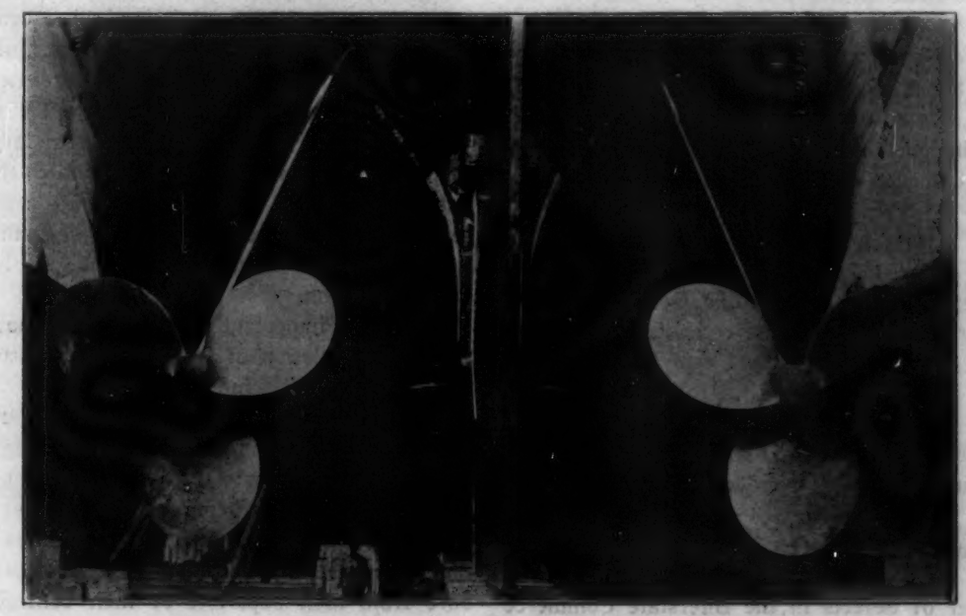


Fig. 4.—Two 13-Ft. Monel Metal Propellers on the North Dakota.

The New England Foundrymen's Annual Meeting.

The New England Foundrymen's Association held its annual meeting and dinner at the Exchange Club, Boston, January 12, with President William A. Viall in the chair. Officers for the ensuing year were elected as follows: President, J. L. Anthony, Weir Stove Company, Taunton, Mass.; vice-president, H. E. Wetherbee, James Hunter Machine Company, North Adams, Mass.; treasurer, George H. Lincoln, G. H. Lincoln & Co., Boston; secretary, Fred F. Stockwell, Barbour-Stockwell Company, Cambridge, Mass.; executive committee, Robert C. Bird, Broadway Iron Foundry, Cambridge, Mass.; C. A. Reed, Hickman, Williams & Co., Boston; George H. Cushing, H. B. Smith Company, Westfield, Mass.; Charles Nutter, Old Colony Foundry Company, East Bridgewater, Mass., and F. C. Stickel, Capitol Foundry Company, Hartford, Conn.

The report of the secretary showed a membership of 117 concerns, and that of the treasurer a large balance on hand. The William J. Breen Company, Boston, and the J. W. Paxson Company, Philadelphia, were elected to membership. Some 100 members and friends were present at the dinner, at which Henry A. Carpenter, Providence, R. I., was master of ceremonies. The speakers were Mr. Carpenter, Hon. Richard E. Warner, former Mayor of Taunton, and Edwin E. Bartlett, president of Boston branch, National Metal Trades Association. A vaudeville entertainment closed the evening.

The Midvale Steel Company, Philadelphia, Pa., is increasing its steel producing capacity by additions of a 50 and a 35 ton open hearth furnace.

THE IRON AGE

Established in 1855.

New York, Thursday, January 20, 1910.

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The report of the tribute to Charles Kirchhoff, retiring editor of *The Iron Age*, which appears elsewhere in this issue, will be read with interest not only by his personal friends but by those who have only known of him through his long connection with this journal. The commendations of Mr. Kirchhoff were especially remarkable from the fact that they covered much more than his achievements as an editor or an engineer. While great praise was given to him for his work as editor, the keynote of the occasion was the recognition of his fidelity to his convictions, the uprightness of his character and the sturdiness with which he has ever stood for what was right. Beyond being a tribute to his personality, it was a notable demonstration of the influence of character in journalism.

The Iron Age Index.

The index to Volume 84 of *The Iron Age*, July 1 to December 31, 1909, has been compiled and printed and will be mailed to subscribers applying for it. A list of those who have received the index heretofore is kept in this office, and to all such the latest one will be mailed without notice from them. Additional names will be put upon this list on request.

Amendments to the Commerce Act.

A number of defects in the Interstate Commerce law will be corrected if Congress adopts amendments proposed by the President and incorporated in a bill which has been introduced at Washington. One of the most important changes makes it the duty of a railroad to quote rates to shippers in writing on request. During the 23 years interstate commerce legislation has been in effect the law has followed the clumsy theory of merely requiring tariffs to be posted at railroad stations, and the shipper has been left to his own diligence to ascertain from these posted tariffs what may be the legal rate for any particular service. In commercial usage, the consignee pays the freight. If the carrier complied with this provision, the consignee would find at his local station a bewildering array of documents showing what he would have to pay for shipments to other parts of the United States; but no exact legal knowledge regarding the rates he was actually paying on shipments received. This curious phase of the law illustrates the difficulties of any attempt to regulate commerce by law.

Under the proposed amendment any one who has business with a railroad can request a rate in writing, and the proper railroad officer must comply. This is a tardy recognition of the fact that the shipper or consignee has rights in his dealings with a railroad. The theory of the original Reagan bill, introduced in Congress in 1884, was to promote justice between the railroad and the citizen who shipped or received freight, without any ministerial regulation by the Government, but this theory was discarded in Congress and supplanted by the bureaucratic notion of regulating the railroads by the power of the Government. Even this proposed amendment does not restore a contract relation between the shipper and carrier. It does not provide that the rate quoted by the railroad in writing shall be binding as the price to be collected for the service. It merely fixes a fine to be inflicted on the railroad company if a shipper suffers damage through an erroneous quotation.

One right, however, will be restored to the shipper without bureaucratic qualifications, if the amendment is adopted which allows the shipper to choose the route, where two or more routes are available. Since the Hepburn law was enacted the railroads have assumed with slight color of authority that the initial carrier had the right to designate the connecting line over which a shipment should be forwarded. The Interstate Commerce Commission subsequently recognized the right of the consignee to designate the delivering road, but on long hauls the intermediate route has been controlled and dictated by the initial line. This policy has increased the power of large railroad systems and the traffic associations which they control, but it has had the effect of destroying competition in service, as the shipper has had no opportunity to favor the intermediate carrier that might give his business better attention.

The most important provision of the new bill deals with the regulation of stock and bond issues of railroads engaged in interstate commerce. This may prove of great interest to shippers because the desire to advance rates and increase the earnings has been stimulated in the past by the opportunity to capitalize earnings through mergers, consolidations or stock dividends, and if this incentive is eliminated the traffic officials of the carriers may be subjected to less pressure from their superiors or their controlling stockholders. The bill provides that stocks, bonds and other securities must be sold at par unless the Interstate Commerce Commission, after formal consideration, issues a certificate permitting the sale at a discount or allowing property to be taken in exchange for the security. In case of judicial sale and reorganization of a railroad, the commission is to ascertain whether the securities issued do not unreasonably exceed the fair estimated values of the properties acquired, and a certificate from the commission is also necessary in case of any consolidation or merger of two or more railroads. The bill will forbid the purchase by one railroad of the stocks or securities of a competing line. For many years the leading dividend paying railroads have raised a considerable portion of their new capital by the sale of their stock at par, and there is no doubt that it will meet with general approval of investors, shippers and the public if this rule which has been followed by conservative railroads is enacted into a law that will be binding upon all.

A feature of the bill which may seem inconsistent is the legalizing of traffic associations of the railroads. These associations have already acquired enormous powers under the Interstate Commerce law. When a shipper makes any request for a readjustment of rates the matter is not decided by the railroad directly involved. It is referred to the traffic association controlling the district through which the freight moves. In due time it is considered by a committee consisting of one representative of each of the important competing roads in the district. If one member of this committee votes against the request, the record of the committee shows unanimous disapproval. Where the railroads for any reason desire to increase their rates they can usually obtain a unanimous agreement in their committee, but a shipper must control an enormous tonnage or be able to present unusual reasons in favor of his request to obtain such unanimous consent for a reduction. While each road reserves a nominal right to take individual action in making tariffs, there are great difficulties in the way of such action. One of these difficulties has been created by the Government through the Interstate Commerce Commission, which requires that a railroad shall appoint one agent to file and issue tariffs on any particular class of traffic. The competing roads in each district, with the approval of the commission, have given their powers of attorney to one joint agent who is usually the commissioner or chairman of the traffic association in that particular district. The Interstate Commerce Commission declines to receive or legalize a tariff filed through any one other than the regular agent appointed for that purpose, and a railroad is thus barred from taking individual action regarding any one rate without pulling down the entire structure of the traffic association.

While many large shippers who are experts in matters pertaining to freight rates believe that the traffic association is an unavoidable necessity and might as well be legalized, there may well be a difference of opinion as to giving these bureaus further powers as agencies of bureaucratic government.

Germany Pressing Great Britain on Iron and Steel Exports.

Pre-eminence in iron and steel exports has always been a source of pride to British manufacturers, and perhaps more so in recent years, as the gap has widened between British iron and steel production and that of the United States or even of Germany. It has supplied satisfaction in the face of various evidences of British industrial decadence. Startling must be the effect, therefore, of recent statistics marshaled by the London *Iron and Coal Trades Review* showing that Germany is overhauling Great Britain in the race for the world's markets for iron and steel products. Going back to 1897, when export bounties were put in effect to foster Germany's foreign trade, the record of the two countries is as follows:

Exports of Iron and Steel Products by Great Britain and Germany.

	Great Britain.	Germany.		Great Britain.	Germany.
Year.	Gross tons.	Metric tons.	Year.	Gross tons.	Metric tons.
1897	3,318,000	768,000	1904	3,366,000	2,770,000
1898	2,902,000	847,000	1905	3,271,000	3,349,000
1899	3,368,000	777,000	1906	4,682,000	3,666,000
1900	3,213,000	838,000	1907	5,311,000	3,455,000
1901	2,617,000	1,410,000	1908	4,233,000	3,732,000
1902	3,241,000	2,126,000	1909*	3,074,000	3,089,000
1903	3,209,000	2,199,000			

* First nine months.

It is not new for our British friends to say, when facing an unfavorable statistical comparison, that there is no reason, so far as cost of production is concerned and ability to compete, why the products of other countries should be preferred to those from Great Britain. We are not surprised, therefore, to find our London contemporary commenting on the above figures in this strain:

> There is absolutely nothing of a fundamental character to enable that country to beat us. We can assemble raw materials at furnaces, we can smelt iron ore, make steel, and put the finished products on board ships, just as we can build a ship and her engines, at a less cost than Germany, or any other country in the world. Of course, the rapid industrial progress of Germany is frequently attributed to cheap labor. But what are the facts, so far as the iron industry is concerned? Fifteen years ago representatives of the British Iron Trade Association, upon their return from a visit to the leading iron and steel works in Germany, expressed their surprise at finding how very nearly the wages paid in that country were to those prevailing here. Since then the wages in a dozen selected skilled occupations have gone up by 22 per cent. in Germany, against 11 per cent. in Great Britain, while the wages of unskilled labor have increased by nearly 40 per cent. in Germany against no increase at all in our iron trade.
>
> It seems clear, then, that Germany's success is due neither to superior natural resources nor to cheap labor. On the contrary, organization appears to be the mainspring of industrial and commercial progress. Without its vast system of syndication—its almost military-like productive and distributive methods—and the organized fostering of export trade by bounties, the German iron and steel industries could hardly have attained their present status. Germany is going ahead because her manufacturers and merchants are organized. Britain is standing still because her manufacturers and merchants are not organized. In Germany the production and sale of practically every material and article of iron and steel manufacture, from iron ore to wire nails, are controlled by a powerful syndicate, or manufacturers' union. Output is regulated, trading zones mapped out, prices fixed, sales effected, and export trade subsidized, by co-operative agreement. Since the export bounty system was inaugurated 12 years ago, German iron and steel exports have increased by about 400 per cent. The lesson for this country is plain. We have got to meet in competition the trading methods and prices of strongly organized trade rivals.

Doctors may disagree as to the precise reason for one and another defeat Great Britain is meeting in the modern industrial campaign, but we have yet to see any determined effort to alter conditions of manufacture or methods of marketing product which have prevailed in the British Isles for years. The lack of organization is undoubtedly one of the great weaknesses in the position of manufacturers and merchants there. It is a question, indeed, whether the British temperament will not need to change radically before the successes in both manufacturing and selling, which are so conspicuous in Germany, can be approached. But other reasons of an economic character, that have been repeatedly dwelt on, are so influential that only the adoption of policies against which Great Britain has steadily set herself promises any way out. As a starting point, British economists and legislators might well address themselves to some curtailment of their country's iron and steel imports, which in 1908 amounted to about 1,000,000 tons, valued at $35,000,000.

German Machine Tool Exports.

Special Agent Captain Godfrey L. Carden, in a recent report to the Department of Commerce and Labor on machine tools in Austria-Hungary, gives some interesting statistics of German machine tool exports. He says:

"In any discussion of the use of foreign machine tools in Austrian establishments it is of interest to note what proportion of the exports of metal workers' tools from the neighboring empire of Germany reach Aus-

tria. It is likewise of equal interest to note whither the exports of machine tools from Germany go. The following table is therefore made up from the German imperial statistics for 1908, weights being given in kilos of 2.2 pounds each:

Whither exported.	Kilos.	Whither exported.	Kilos.
Italy	9,562 900	Norway	405,100
Austria-Hungary	9,216,100	Brazil	392,700
France	5,705,700	Finland	351,700
Russia in Europe	3,141,800	United States	250,800
Belgium	2,894,400	China	227,500
Switzerland	2,154,900	Turkey in Europe	219,800
Sweden	1,379,100	Dutch Indies	158,700
United Kingdom	1,314,000	Chile	145,800
Netherlands	1,169,800	Portugal	96,700
Denmark	950.800	Australia	94,200
Japan	917,200	Bulgaria	93,300
Spain	872,300	All other countries	691,200
Argentina	665,500		
Roumania	557,400	Total	43,629.400

"The total exports for 1908 of machine tools from Germany exceeded those for 1907; also the quantity, 9,216,100 kilos, sent to Austria-Hungary exceeded considerably that of 1907, which was but 6,526,200 kilos. The total German export of machine tools in single pieces in 1907 was 52,553 and in 1908 it was 52,264."

The last paragraph is especially significant. The fact that German exports in 1908 were so close to those of 1907 should be taken seriously to heart by our machine tool manufacturers. In 1908 our shops were running either on part time or with greatly reduced forces, while apparently the opportunity existed in Italy and Austria-Hungary for business which would have enabled many more men to be employed here if the right means had been adopted to secure it. Our machine tool builders should seek actively for orders in the countries which are apparently worked so successfully by our German competititors. They can undoubtedly get the business if they send good, live representatives to look after their special interests. As far as direct representation has been tried in this branch of business it has proved productive of good results.

CORRESPONDENCE.

Mechanically Held Impurities in Steel.

To the Editor: Reading over my article, "The Freeing of Steel from Mechanically Held Impurities and the Prevention of Segregation and Piping," which appeared in *The Iron Age* of January 13, I find that I have made a mistake. The sentence, "Or an obvious corollary to this process would be to combine mold and furnace into one; that is, to melt and refine, as well as kill and cool in the mold," should read "melt (not refine) as well as kill," &c.

GEORGE AUCHY.

TACONY, PHILADELPHIA, January 14, 1910.

The York Motor Car Company, Inc., York, Pa., mentioned in *The Iron Age* some time ago as having secured a site at Evansville, Ind., will retain its present plant at York, Pa., but will build a branch factory at Evansville in which it expects to operate new departments for drop forgings, castings, axles and other parts for automobiles. It is expected that the new plant will contain between 150,000 and 200,000 sq. ft. of floor space, most of which will be on the ground floor. During the present season the company will build 2000 cars, but it is the expectation to double this amount in 1911.

Apprenticeship Movement in Cleveland.

Owing to the heavy demand from the automobile industry for machinists, the metal working shops in Cleveland, Ohio, have suffered from a scarcity of skilled workmen since the revival of business nearly a year ago. As a result of the city's close proximity to the big Michigan automobile plants, a number of which have built immense additions during the past year, to say nothing of the growth of that industry in Cleveland itself, large numbers of skilled machinists, in many cases attracted by higher wages, have left the shops in which they were formerly employed to work in automobile factories.

The growing scarcity of skilled workmen has, therefore, made the apprenticeship problem a particularly important one, and one which the Committee on Apprenticeship of the Superintendents' and Foremen's Club of Cleveland has had under consideration for some time. At a meeting held January 15 the committee made a report which was adopted by the club, and steps will be taken at once to carry out its recommendations. The committee decided that while everything should be done to apprentice young men to the metal trades, those trades in Cleveland are so diversified, manufacturing so many different kinds of commodities, and therefore each employing different classes of mechanics, that a general apprenticeship arrangement would seem to be a difficult thing to put into effect, and it was a question whether such an apprenticeship contract, covering all the metal trades shops in Cleveland or any considerable number of them, would be successful.

While believing it inadvisable to attempt a general apprenticeship contract covering all shops, the committee declared that individual shops that are in a position to teach young men a trade should do so. Its recommendations are as follows: That every metal trades shop in the city that can do so put into effect some sort of an apprenticeship arrangement, doing everything possible to apprentice young men to the trades, thereby making as many apprentices as possible; that the secretary of the Cleveland branch of the National Metal Trades Association and the Superintendents' and Foremen's Club prepare a complete roster of all the metal trades shops in the city, and that the Apprenticeship Committee of the club shall go over it, picking out those shops that are in a position to employ a certain number of apprentices; that the secretary communicate with the shops chosen, telling them of the action and encouraging them to enter into some apprenticeship arrangement; that the secretary for a period of, say six months, keep in constant correspondence with these different shops in order to urge them to do everything possible looking toward apprenticing young men; that a regulation of apprentices be arranged, the details to be arranged through the secretary of the Cleveland branch of the National Metal Trades Association; that such a system of regulation be provided that a young man shall be kept at his trade until he has completed it, so that one shop does not hire him away from the place where he is employed until he has completed the required term.

The recommendations of the committee will be taken up by the Executive Committee of the Cleveland branch of the National Metal Trades Association, and the full co-operation of that organization is expected.

The Detroit Seamless Steel Tubes Company, Detroit, Mich., is installing machinery in the large addition to its plant recently erected which will increase its output 25 per cent. The addition is 60 x 250 ft. and will give employment to many more men. At present about 400 men are on the payrolls and the plant is running rouble time to keep pace with the influx of business.

PERSONAL.

The Van Dorn Electric & Mfg. Company, Cleveland, Ohio, announces that W. J. Greer is again in his old field in Pittsburgh, representing the interests of the company in the sale of Hard Service electric drills and reamers.

J. H. Plummer, president of the Dominion Iron & Steel Company and the Dominion Coal Company, announces the appointment of M. J. Butler, Deputy Minister of Railways, has been appointed vice-president and manager of both companies.

B. F. Bourne, president of the Bourne-Fuller Company, Cleveland, will spend the next two months in California.

Dr. Richard Moldenke, secretary of the American Foundrymen's Association, sails for Europe this month on a professional commission.

F. D. Johnson of the Consolidated Pneumatic Tool Company of London, sailed for England January 19, after a brief visit in this country.

Leo Steinle, representing the Gisholt Machine Company, with offices at the headquarters of Alfred H. Schutte, Cologne, Germany, sailed for home January 19, after a five weeks' stay in the United States.

James Morton, Jr., who represents a number of American manufacturers in the Far East, left this country January 19 for an extended trip through India, China, Japan and Australia. He will be gone perhaps a year.

Charles A. Schieren, Jr., of the Charles A. Schieren Company, is making his annual visit to the company's European offices. He sailed January 19 and will be abroad six weeks, spending most of his time at the London and Hamburg offices.

Prof. R. C. Carpenter of Cornell University, and E. H. Faile, have entered into partnership under the name of Carpenter & Faile, with offices at 68 William street, New York City. This new firm will specialize in the mechanical and electrical equipment of buildings, including power plants, heating and ventilation, sanitary installations, elevators and illumination.

Frank M. Eaton of Hickman, Williams & Co., left Cincinnati Tuesday evening for Mexico on a short vacation.

Several important changes have been made among the executive officers of the Pressed Steel Car Company, Pittsburgh. The office of first vice-president in charge of operation, which was held by J. W. Friend, deceased, has been abolished, and O. C. Gayley, second vice-president and general manager of sales, with headquarters in New York, has been made vice-president. Mr. Gayley will remain in New York in charge of the sales department. James B. Rider, general manager of the company, has been placed at the head of the operating department. The auditing department has moved from the Farmers' Bank Building to the McKees Rocks office building, while the treasurer and sales department will remain in Pittsburgh.

M. W. Head, formerly treasurer of the Jamison Coal & Coke Company, Pittsburgh, is now general superintendent of the company's West Virginia plant, with an office in Fairmount, W. Va.

Capt. Godfrey L. Carden of the United States revenue cutter service, who has spent a large part of this year abroad as special agent of the Department of Commerce and Labor in reporting on machine tool interests, has returned to this country, the time for which he was detached from his regular duties having expired. His reports of the results of his investigations, which have been of great value to our manufacturers, have been appearing from time to time in the daily consular reports issued by the Department. He goes to the Pacific Coast to take charge of a vessel in the revenue cutter service, but his permanent address is at the Lotos Club, New York City.

Frederick N. Pease, assistant chemist, has been appointed to succeed the late Dr. Charles B. Dudley as chemist of the Pennsylvania Railroad.

J. Kent Smith, who returned to England last year after spending two years in the United States in the interest of vanadium steels, has been elected a director of the International Vanadium Company, Ltd., which has works at Garston, Liverpool. H. A. Blackwell, chairman of Geo. G. Blackwell, Sons & Co., Ltd., is chairman of the company.

F. H. Burnett has been appointed general purchasing agent of the Lackawanna Steel Company, Buffalo, N. Y., in place of John N. Allen, resigned. Mr. Burnett was previously assistant purchasing agent.

Lester L. Shannon, formerly with the International Harvester Company, Chicago, is now connected with the Bernard Glocker Company, Pittsburgh, as advertising manager.

OBITUARY.

JOHN W. NESMITH, president of the Colorado Iron Works, Denver, died December 17, aged 75 years. He was born in Chillicothe, Ohio, in 1834, and went to Denver in 1860. After being employed on railroad construction he bought, in 1879, an interest in the Colorado Iron Works, than a small concern, of which he was made superintendent and general manager. In 1885 he became president of the company, and greatly extended its business. He was a member of the American Institute of Mining Engineers, Denver Society of Civil Engineers and Colorado Scientific Society.

AUGUSTUS C. CAREY, Boston, Mass., widely known as in inventor of mechanical and electrical devices, is dead at the age of 85 years. He was born in Lempster, N. H. In his early life he worked as a machinist and finally established a shop of his own. He took out his first patent in 1850, on a carpet sweeper, which he manufactured for a while. A hundred patents were granted him, including machinery used in woolen manufacturing, electric lamps and wireless telegraph apparatus. He was once nominated for Lieutenant-Governor of Massachusetts, but declined the honor. He served in the Legislature of his State, both in the House and Senate, and for years was a member of the State House and Railroad commissions.

HENRY C. HUNT, Boston, Mass., of the firm of Henry C. Hunt & Co., manufacturers of leather belting, died January 8, aged 71 years. He was a native of Newton Lower Falls, Mass., and had been manufacturing belting since the early '50s.

JOSEPH EDWIN JENCKES, Pawtucket, R. I., prominent as a manufacturer, died January 7, aged 58 years. He was born in Woonsocket, R. I., April 18, 1851. In 1871 he moved to Pawtucket, establishing with his father the firm of E. Jenckes & Co., manufacturers of wire goods. Later he founded the Jenckes Knitting Machine Company and the Jenckes Spinning Company, of both of which he was treasurer at the time of his death. He was president of the Tamarack Company and the National Ring Traveler Company, both of Pawtucket. He leaves a widow, two sons and a daughter.

JAMES W. FULLER, Catasauqua, Pa., died January 14, from apoplexy, aged 65 years. He served with distinction in the Civil War and afterward became identified with manufacturing industries in the Lehigh Valley, establishing the town of Fullerton. His business interests were varied and extensive.

The Bethlehem Steel Company.

Additions and Improvements at the Lehigh Plant.

Brief statements have been given in these columns from time to time of improvements about to be undertaken by the Bethlehem Steel Company. The following résumé of the new work in progress at South Bethlehem and its present status will be found of interest:

The company has just completed and is putting into service two additional 36-pot crucible melting furnaces, with the necessary gas producers, scrap shears, scrap bins and all other equipment, which will more than double the producing capacity of crucible steel. There is also under construction a complete cold drawing plant for the cold drawing of crucible tool steel and other alloy steel bars.

The contract has been let for the construction of a large erecting floor in connection with the machine shops. This will be about 384 ft. long., 75 ft. wide and 55 ft. clear hight. It will be used for the assembling and erection of gas engines and large pumping engines. No. 6 machine shop, which is alongside this erecting floor, has had very extensive additions made to it in the way of large planers, boring mills, drills, &c., for the machining of gas engines and pumping engines. Additions of machine tools have also been made in the company's other machine shops.

In the blast furnace department furnace D is nearing completion and will be put in blast some time in February. Contracts have been let and work begun on two more furnaces, F and G, 22 x 90 ft., complete with five stoves each, gas washers, &c. In connection with these furnaces the company is installing a double strand Uehling casting machine and two sets of the Hoover & Mason type of coke and ore bins, such as are already in use at the South Bethlehem furnaces. For blowing the furnaces there are being built at Bethlehem nine large single gas driven engines, which will not only take care of the two new furnaces to be built, but will replace a large number of old steam blowing engines, which have been in service for many years.

In addition to the 1500-kw. gas driven power engine, which has been in service for five or six months, two 1500-kw. gas driven engines are in course of construction in the Bethlehem Steel Company's shops at the present time. This additional power is being installed for the purpose of electrifying the merchant mills, and motors will entirely replace the steam engines now driving these mills. The steam engines which are at present driving the large machine shops will also be replaced by motors, and this will make all of the machine shops completely motor driven. This electrification of drives in the mills and machine shops will materially reduce the power cost for these departments, as all of the power will be generated by gas engines, using blast furnace gas exclusively.

Additional hammers and presses are being installed in the drop forge department.

Steel Works Additions at Saucon Plant.

For the purpose of operating under the duplex process at the Saucon plant, complete Bessemer equipment is being installed, consisting of two 20-ton converters and one 400-ton mixer, together with the necessary drying ovens, ladles, cranes, &c. The present 250-ton mixer will be moved from the west end of the open hearth plant (consisting of 10 50-ton furnaces) to the east end, alongside of the new 400-ton mixer. This plant will be situated at the east end of No. 2 open hearth plant, and so arranged that steel can be taken directly from the converters to the charging floor of the open hearth.

In order to handle more expeditiously the hot steel from the open hearth furnaces the two existing ingot strippers and the building therefor will be moved directly alongside of the open hearth building, so that steel may be supplied to the soaking pit building from either end, or in the middle. In the open hearth department an additional crane runway and crane will be erected for the purpose of handling scrap at the scrap shear.

For the rail finishing department a double drum rail loading crane equipped with magnets has been purchased and will be installed on a 400 ft. runway.

The increased amount of open hearth scrap and cinder due to the increased capacity resulting from the duplex process requires the erection of another scrap breaking plant to the east of the open hearth, which will be used for the breaking up of scrap and the reclamation of the steel scrap in the cinder.

A brick and steel machine shop 55 x 360 ft. will be erected, with the idea of concentrating all the roll lathes and all repair work (both mechanical and electrical) for this plant.

A new brick and steel general office building will be erected in connection with the Saucon works.

Rusk Furnace, Texas, Leased to Citizens.

AUSTIN, TEXAS, January 14, 1910.—The Board of Penitentiary Commissioners has leased to John L. Wortham of Dallas and associates the State's iron works at Rusk for a period of three years, with the option of renewal for seven more years. Mr. Wortham, who promoted the leasing of the plant, was formerly financial agent of the penitentiary. For four years he directed the operation of the blast furnace. He claims that the State made good profits out of the business under his management and that private interests can make it pay.

Under the terms of the lease Mr. Wortham and associates are to pay an annual rental of $10,000 to the State and 90 cents per ton for the iron ore. The bond of the lessees is fixed at $50,000, of which $25,000 is for the return of the plant in good condition, $15,000 to secure the payment for the iron ore, and $10,000 for the annual lease rental. Mr. Wortham says that he and his associates will spend at least $50,000 in making improvements to the furnace and pipe foundry. The furnace is of 100 tons capacity. New pumps and new hoisting machinery will be installed. The plant will be placed in operation as soon as it can be gotten in shape. It is understood that it will be operated chiefly by convicts who will be leased from the State for the purpose.

The Birmingham Horse Shoe & Rolling Mills Company has been incorporated at Birmingham, Ala., with a capital of $1,000,000. N. K. Reed is president and W. T. Shipe vice-president, both of Middletown, Ohio. E. L. Penruddocke of Birmingham is consulting engineer. In addition to an output of 400 kegs of horseshoes per day, it will have for the market 100 tons of bar iron. Plans have been drawn up and contract let to the Birmingham Construction Company for the erection of buildings, which will be of steel, with concrete foundations.

The Tygard Engine.—Two companies, it is announced, are now being organized in London to manufacture the Tygard four-cycle double-acting single-cylinder gas engine under royalties for aeronautical and automobile purposes, both in England and France, and the German War Department is reported to be making a test of the new engine with a view to adopting it for military purposes in aeronautical use. It is built in this country at Plainfield, N. J.

The Condition of the Hardware Trade.

The following reports of the condition of the hardware trade are taken from *Iron Age-Hardware* of January 15:

Following the custom, after the holidays, there is a temporary lull in some channels of business, attributable partially to stock inventorying, homecoming of salesmen for year end festivities with families and friends, and the pause in mercantile life incidental to settlements and striking of balances. Salesmen, however, are now either starting out again or preparing to do so soon, the first to get away being those whose routes lead to milder climates. The severe and widespread meteorological disturbances following an unusually warm fall have covered winter crops with protecting snow and reinforced a depleted water supply. The wintry conditions have also greatly helped distributors by emptying shelves of seasonable goods in innumerable lines, which otherwise, in a measure, would have been carried over; thus clearing the way for future renewal of stocks and reorders for current business. These sales also put large sums of money into circulation in different channels which employees, owing to more universal employment and increased incomes, are in a position to spend.

Evidences of national prosperity are the almost doubling of individual bank deposits in the last decade, the constant increase in transportation facilities and equipment, the possession in this country, according to government statistics, of almost one-half of the world's money wealth, the prosperity of farming communities and the full day and full force activity by manufacturers after a period of marking time. Stocks in retailers' hands are moderate and, while some time yet must elapse before the forward movement will reach all interests, still the business record of the past half year is an earnest of what is in store for the commercial world.

Bearing in mind that classes of goods dealt in by hardwaremen are not so subject to the wide fluctuations common to merchandise of a more luxurious character, the return to normal conditions should find the average hardware merchant in better financial shape at once to conduct a larger and more profitable business. With the increase of transportation facilities and greater ease of communication, orders for less in volume at a time are more frequent and better suited to purchasers' wants, thus insuring cleaner stocks and fewer unsalable goods. There are also evidences of more prompt remittances and better average collections, the shrewd merchant being fully cognizant of the substantial profit possible through the acceptance of cash discounts.

The California Metal Trades Association.

The California Metal Trades Association held its third annual meeting in San Francisco January 12. J. M. Robinson was re-elected president, S. J. Eva was elected first vice-president and Constant Meese second vice-president. The members of the Executive Committee were chosen as follows: R. H. Postlethwaite, E. J. Fowler, George J. Henry, Jr., William F. Murray, John T. Scott, George E. Randolph, John A. McGregor and Otto Schrader. Matters of general interest coming before the organization were treated by President Robinson in his annual report. Relative to the policy of the organization in avoiding active participation in public movements he had the following to say: "Our attitude toward the labor unions seems not to have pleased some of our friends in the East and nearer home, and our association has been the subject of unfavorable comment in some of the trade papers."

Secretary Harry F. Davis touched upon the important activities of the association during the year just ended in his report. He set forth the information that only seven members were involved in labor difficulties of any importance during the year. Commissioner H. U. Kerrigan read a very interesting paper on "The Real Truth of Conditions and How to Improve Them."

The Cincinnati Industrial Bureau.

The ninth annual dinner meeting of the Cincinnati Industrial Bureau, January 13, was the best in that organization's history. Nearly 200 citizens and guests sat down at the Business Men's Club and listened to inspiring words from Louis Schwab, Mayor of Cincinnati; Don Farnsworth, secretary of the Chicago Association of Commerce; Stanley Bowdle, a Cincinnati lawyer who graduated from the machine shop, and others. S. P. Egan of the J. A. Fay & Egan Company presided as toastmaster.

The excellent report of Secretary and Manager W. L. Finch reviewed the work of various committees in the year. Among the new industries either brought to Cincinnati directly through the bureau's efforts or through co-operation with individuals were the Couch Brothers Mfg. Company of Atlanta, Ga.; the Toledo Electric Welding Company, recently incorporated with a capital of $75,000; the Ohio Steam Shovel Company, established as a part of the plant of the Cincinnati Equipment Company; the Peck-Williamson Company's foundry department, six lumber manufacturing or selling companies, a number of large coal concerns, and the location of a dozen branch or head sales offices of large manufacturing concerns seeking distributing points.

Among industries for which the bureau is still negotiating is a large plant for the manufacture of heavy machine tools, of which there are at present but two in the United States, and a large chair factory which desires a location on the Ohio River. The official organ of the bureau and of industrial Cincinnati, the *Cincinnati Magazine*, was launched in the year. Annexation of various suburbs was the concluding topic of the secretary's message.

The following directors were elected and from them will be selected the officers for the coming year: S. P. Egan, Fred H. Ballman, E. R. Blaine, George F. Dieterle, Walter A. Draper, W. A. Hopple, James J. Heekin, Guy H. Kennedy, E. P. Marshall, James P. Orr, W. M. Perin, Fred Tuke, T. C. Powell, L. J. Rebhun and George D. Crabbs. Mr. Dieterle, as chairman of the Annexation Committee the past year, will doubtless be elected president at the organization meeting to be held this week.

The Barnes Drill Company, Rockford, Ill., has purchased a site containing about 11 acres, upon which it will erect a new factory building, 100 x 200 ft., one story, of brick and steel construction. The entire plant will be designed for future growth and later buildings will be added in harmony with the present plans. Every modern device for the economical handling of material and parts will be used. The company manufactures upright and gang drills and extension gap lathes.

The plant of the Bird Iron Company, Ironton, Ohio, which has been idle some time, was sold at auction January 14 for $99,000 to D. C. Davies, H. A. Marting and other Ironton capitalists. Among the bidders were J. K. Pollock of Rogers, Brown & Co., Cincinnati, and Feiser & Bentley, Columbus. It is expected that the purchasers, who own and operate blast furnaces of the Ironton Iron Company and others in the district, will repair and put the plant in operation by the middle of the year.

Labor Notes.

The bimonthly settlement of the puddling and finishing scales was made in Pittsburgh last week, and for January and February puddlers will be paid on the basis of $5.50 per ton for puddling, the same rate as during November and December.

Reports that the Osterberg Tin Plate Company, which some time ago bought the plant of the Washington Forge, Sheet & Tin Mills at Waynesburg, Pa., had signed the Amalgamated scale, are officially denied.

Work Held Up at Venezuelan Iron Mines.—A Caracas dispatch of January 13 says that the Venezuelan Government has notified representatives of the Pan-American Ore Company that it will not recognize the transfer of the Imataca iron mines to that company on the ground that the title to the property is in question. The protocol signed by Commissioner William I. Buchanan of the United States and the Venezuelan Government prohibits any one taking possession of mines in the Imataca field until the title is cleared. The Pan-American Ore Company, in which Charles M. Schwab and others are interested, is incorporated in Delaware and has offices in New York City. It had been the intention of the company to begin work at an early date.

New $2,000,000 Cement Plant at Buffington, Ind.—The United States Steel Corporation will spend $2,000,000 for an addition to the plant of the Universal Portland Cement Company at Buffington, Ind. It will have a capacity of 6000 barrels a day, making the output of the entire plant 17,000 barrels daily, the largest from one group of works in the United States. The enlargement is made necessary by the greatly increased demand for concrete construction in the Middle West, which the present plant is unable to meet.

Passaic Structural Steel Company.—Members of the bondholders' committee which bid in the property of the Passaic Steel Company at the chancery sale a few weeks ago have organized the Passaic Structural Steel Company, a New Jersey corporation. F. C. Reinhardt has been elected president and J. Barclay Cooke secretary and treasurer. The new company is now operating the bridge shop at the Paterson plant and expects in time to start the open hearth steel department, but plans for this have not yet been matured.

Correction.—The statement in *The Iron Age* of January 13 that John N. Allen, formerly general purchasing agent of the Lackawanna Steel Company, Buffalo, N. Y., had been appointed general manager of the Davidson Foundry Company, Chicago, should have read Hubbard Steel Foundry Company.

The Mesta Machine Company, Pittsburgh, has made the following shipments from its plant at West Homestead, Pa.: Youngstown Sheet & Tube Company, Youngstown, Ohio, a 34 and 60 x 60 in. twin tandem compound Corliss engine; Standard Steel Works, Burnham, Pa., a 20 x 36 in. four-valve engine; Tennessee Coal, Iron & Railroad Company, Bessemer, Ala., a 40 x 60 in. four-valve engine.

The Follansbee Brothers Company, Pittsburgh, has recently opened offices in the Marvin Building, San Francisco, Cal., in charge of George S. Lacey, and a stock of all its branded sheets, tin plate, &c., will be carried in the Barneson-Hibbard warehouse to supply the Pacific Coast trade.

The Westinghouse Machine Company, East Pittsburgh, Pa., has received an order for two 5000-hp. turbo generators for the Aliquippa plant of the Jones & Laughlin Steel Company, in addition to an order placed some time ago.

The Rockwood Sprinkler Company's New Plant.—The Rockwood Sprinkler Company, 206 La Salle street, Chicago, has just completed the first unit of its new factory, located in the central manufacturing district of that city, and is equipping it with the most approved machinery. The plans call for individual direct connected motors to all machines, the hoisting and conveying machinery to be operated with magnet lifts. The present buildings consist of pipe storage and cutting, pipe threading and machine shop. The company will begin in the spring the erection of extensions to the machine shop, forge, foundry and storage buildings. These buildings are on the Chicago Junction Railway, and, through that road, have direct connection with all freight lines entering Chicago. It is of interest to note that this is the first complete plant of its kind in the West and indicates the rapid growth in the manufacturing of equipment for fire protection.

At the annual meeting of the American Exporters' and Importers' Association, New York, held January 13, the following officers were elected for the coming year: President, W. H. Douglas, Arkell & Douglas; vice-president, W. E. Peck, W. E. Peck & Co.; treasurer, John R. Bradlee, H. W. Peabody & Co.; secretary, Geo. F. Trowbridge, Strong & Trowbridge Company. The directors are G. Vintschger, Markt & Hammacher Company; R. McL. Cameron, R. W. Cameron & Co.; H. F. Runge, Graham, Hinckley & Co.; C. D. Barry, H. W. Peabody & Co., and Geo. F. Trowbridge.

The bridge over the Ohio River between Louisville, Ky., and New Albany, Ind., is to be rebuilt. It was built more than 20 years ago and was one of the first cantilevers in the West. It was designed by the late Col. John C. MacLeod. It was owned by the Kentucky & Indiana Bridge Company, with headquarters at Louisville, but was purchased jointly a few years ago by the Monon, Baltimore & Ohio Southwestern and Southern Railway companies.

Pickands, Mather & Co., Western Reserve Building, Cleveland, in an attractive pocket size pamphlet present their list of Lake Superior ores for sale in 1910, with exhaustive analyses covering shipments of 1909. There are six Old Range Bessemer ores, 15 Mesaba Bessemer, 11 Old Range non-Bessemer, 10 Mesaba non-Bessemer and 3 siliceous ores. The cover of the pamphlet bears a photographic view of the Brotherton and Sunday Lake mines on the Gogebic Range.

The Sandusky Business Men's Association, Sandusky, Ohio, which was recently formed to secure new industrial enterprises for that city, has completed its organization by the election of the following officers: President, J. J. Dauch; first vice-president, P. A. Rice; second vice-president, L. L. Curtis; secretary, J. C. Hauser; treasurer, George A. Schwehr. The association has received over 100 inquiries from concerns that are seeking new locations.

The Penn Metal Ceiling & Roofing Company, Ltd., has moved into offices, 403 to 407, inclusive, in the new Boston Safe Deposit Building, 1 Devonshire street, corner Franklin, Boston, Mass. The location is in the heart of Boston's business district. The company has a new warehouse and factory in South Boston, with floor space of over 20,000 sq. ft., enabling a larger stock to be carried, which, with a private railroad siding connected with the building, will insure prompt deliveries of all orders.

NEWS OF THE WORKS.

Iron and Steel.

The Girard Iron Company, operating Mattie Furnace and a puddling mill at Girard, Ohio, is putting in a system for mechanically breaking pigs and carrying the iron from the casting house. Other than this, the concern has no important improvements under way at its plant just now.

The American Rolling Mill Company has recently added four new annealing furnaces at its sheet mill plant at Zanesville, Ohio. It is stated that other improvements and additions to this plant will be made during the next few months.

General Machinery.

The American Roll & Foundry Company, Canton, Ohio, manufacturer of chilled and sand rolls, rolling mill machinery and air furnace castings, is adding one new air furnace to its plant, giving it a total of three, and provision is being made for a fourth furnace. This will increase the capacity of this company to about 70 per cent. in making sand and chilled rolls, and the new furnace is being built on account of the rush of orders.

The Globe Foundry & Machine Company has been organized at Globe, Ariz., to build a large machinery plant. Except for the repair shops at the smelters, that section has been without foundries or machine shops.

The C. W. Raymond Company, which is planning to construct a new foundry and machinery building plant at Dayton, Ohio, will require shop equipment, engine, dynamos, motors, shafting, pulleys and pneumatic apparatus.

The Du Charme Wrench & Novelty Mfg. Company, Johnstown, Pa., is equipping a plant with machinery for the manufacture of wrenches for automobiles, gas and electric fixtures, machinery, small pipe fittings, &c., to be made under patents of Wm. S. Du Charme, president. The concern will also do model and experimental work and all kinds of plating, and expects to be ready for operation about February 1.

The National Roll & Foundry Company, Pittsburgh, has just completed the shipment of a hydraulic shear, roller table and 100 rolls for the new wire plant of the Southern Iron & Steel Company at Gadsden, Ala., and will shortly ship the second roller table contracted for some time ago. The rolls represent the complete equipment of this order for the new plant. The company has also shipped a 42-in. roll lathe to the Osterberg Tin Plate Company, Waynesburg, Pa.

The Hall Steam Pump Company, N. S. Pittsburgh, builder of air compressors for all purposes and pumping apparatus, last month shipped to Kansas a gas compressor with cylinder 42 in. in diameter and one with a 48-in. cylinder, for use in the gas fields.

The Enterprise Mfg. Company, Pittsburgh, manufacturer of oil filters and feed water strainers, has recently made installations as follows: Youngstown Sheet & Tube Company, Youngstown, Ohio, an oil filter with a capacity of 1000 gallons daily; Republic Iron & Steel Company, multiple strainers for installation in the new tube mill at Youngstown, Ohio, and at the blast furnace at Thomas, Ala.; Andrews & Hitchcock Company, strainers at its furnace plant at Hubbard, Ohio; Carnegie Steel Company, strainers at the Duquesne furnace plant. These strainers are designed for high pressure work up to 300 lb. and are arranged so that one pass can be kept in operation while another is being cleaned.

The Jones & Laughlin Steel Company has placed an order with the Westinghouse Machine Company for two 2500-hp. steam turbines, direct connected to electric generators. The equipment is for installation as a power unit for the new works at Aliquippa, Pa.

Considerable new equipment will be required by the Republic Iron & Steel Company in the rebuilding of the machine shop at the Mahoning Valley Works, Youngstown, which was destroyed by fire recently. Work upon the reconstruction of the shop will begin as soon as the insurance is adjusted.

Contracts for equipment for the extensive additions to the plant of the American Roller Mill Company, Middletown, Ohio, are expected to be placed within the next several weeks. The improvements include billet and sheet bar, plate, jobbing and a number of finishing mills, as well as additional open hearth capacity.

Foundries.

The Lawrence Iron & Steel Foundry Company, Pittsburgh, formerly known as the Yagle Foundry & Machine Company, has finished the building of a 12-ton open hearth furnace for the manufacture of steel castings. The concern also makes iron castings and its iron foundry department is being operated full time.

The Detroit Stove Works, Detroit, Mich., is having plans prepared for a new factory building 66 x 184 ft., five stories.

The Chicago Drop Forge & Foundry Company, Chicago, Ill., will put boilers, engines, dynamos, motors and forging equipment in a new plant, 60 x 75 ft.

The works of the Anniston (Ala.) Foundry & Machine Company will be doubled in capacity, partly by providing the best modern machinery.

The plant of the Enterprise Brass Foundry, Tacoma, Wash., will be greatly enlarged, according to plans now being put in execution.

The St. Paul Foundry Company, St. Paul, Minn., is providing for an increase in its facilities. Erection of a 130-ft. stack for the power house was recently begun.

The Detroit Lubricator Company, Detroit, Mich., has let the general contract for the erection of a foundry 50 x 70 ft.

Bridges and Buildings.

Fabricating machinery to largely increase its capacity will be installed by the Houston Structural Steel Company, Houston, Tex. The shops will also be added to.

The Beach Mfg. Company, Charlotte, Mich., is arranging for the erection of a similar fabricating plant at Grand Forks, N. D., said to be organized as a separate corporation.

Power Plant Equipment.

Recent sales of the Crocker-Wheeler Company, Ampere, N. J., aggregate more than 5000 hp. in direct current motors and approximately 2000 kw. in direct current generators and 2000 kva. in alternating current generators. Prominent among these sales is one to the Bethlehem Steel Company, South Bethlehem, Pa., of five motors, with a total output of 3600 hp. The Bethlehem Company has also ordered 19 Crocker-Wheeler mill motors, with a combined capacity of nearly 800 hp. The Crocker-Wheeler Company has also received an order for one 1200-kva. alternating current generator from the Miami Copper Company, Globe, Ariz., and another from the Virginia Bridge & Iron Company calling for two 2300-volt synchronous motors. Among other late important purchasers are the Weston Electric Light Company, Weston, Mass.; Landers, Frary & Clark, New Britain, Conn.; Burton Powder Company, Quaker Falls, Pa.; Flannery Bolt Company, Bridgeville, Pa.; Textile Building Company, Clifton, N. J., and E. D. Jones & Sons Company, Pittsfield, Mass.

The Erie Engine Works, Erie, Pa., is letting contracts for its new foundry building, 128 x 400 ft., steel and brick construction.

The Allis-Chalmers Company has received an order from the Niagara Falls Hydraulic Power & Mfg. Company for two additional revolving field generators, each 6500-kw., 12,000-volt, 25-cycle, to be hydraulically driven. These generators will be installed in the lower power house, Niagara Falls.

The Fulton Engine Works, Los Angeles, Cal., will enlarge its boiler and machine shop equipment during the present year, as a result of the large volume of business offering. A contract has recently been taken for Government work on the Salt River project.

The Lagona Mfg. Company, Springfield, Ohio, is putting up a new plant for the production of boiler cleaning apparatus. Considerable machinery will be needed. It is laid out for electric drive.

The Gas Machinery Company, Cleveland, Ohio, and Kerr-Murray Mfg. Company, Ft. Wayne, Ind., have taken contract for a new gas generating plant at Ironwood, Mich., which will be the largest, it is claimed, on the Wisconsin-Michigan iron ranges.

Fires.

The hardware factory of the T. C. Richards Company, Winsted, Conn., was recently partly destroyed by fire; loss about $30,000.

Fire at the plant of the Mansfield Rubber Company, Mansfield, Ohio, caused $20,000 damage in the machine shop and rubber room.

The Oriental Metal Bed Company, Hoboken, N. J., was destroyed by fire January 11. The estimated loss is $200,000.

Hardware.

The Kees Mfg. Company, Beatrice, Neb., is proceeding with plans for the erection of a new plant.

The Twentieth Century Hinge Company, Brookfield, Mo., recently organized, is having dies prepared by Veltes & Donegan, Kansas City, Mo., for the manufacture of an adjustable hinge recently patented. Later it is the intention of the company to erect a factory of its own and manufacture hinges of every description. The company expects to have its first lot of hinges ready for delivery about March 1. The officers of the company are T. E. McKinstry, president; W. F. Hunter, vice-president and general manager; D. B. Skene, secretary, and W. W. Martin, treasurer.

Miscellaneous.

The Rainey Coke Company, Pittsburgh, which recently purchased 600 acres of Connellsville coking land in Luzerne and Red Stone townships, Fayette County, Pa., is making arrangements for the erection of 500 or 600 coke ovens. The plant will be a strictly modern one and the design of ovens will be that of the longitudinal type invented by T. J. Mitchell, general manager of the Rainey interests in the Connellsville region.

The Jamison Coal & Coke Company, Pittsburgh, at a recent meeting authorized an increase in its capital from $4,000,000 to $6,000,000. During the last three months it has been forced

to curtail its production of coke owing to a scarcity of water, but has now under construction a new reservoir at its Greensburg Works which will have a capacity of 140,000,000 gal. and, being close to the reservoir recently completed, will give a total of 280,000,000 gal. The new reservoir is located on land recently acquired by the company and will be ready for use about April.

The Commonwealth Trust Company of Pittsburgh, receiver of the General Castings Company, Verona, Pa., will offer the plant of this concern at public sale on Wednesday, February 2.

The O. K. Harry Steel Company, St. Louis, Mo., is preparing plans for a factory building 90 x 100 ft., three stories.

The Dominion Motor Car Company, recently organized at Detroit, Mich., will proceed with the erection of a large factory there. For the present headquarters are to be maintained at 24-6 West Pitt street, Detroit.

The Hollenbeck Mfg. Company, Holdredge, Neb., manufacturer of road grading machinery, is planning to move into new quarters recently purchased as soon as the weather will permit them to be gotten into shape.

The Packard Motor Car Company, Detroit, Mich., has let contract for structural iron to be used in erecting a fifth story to its factory, 60 x 323 ft.

The Northern Engineering Works, Detroit, Mich., will build an extension for its crane department on land recently purchased adjoining its plant.

The Hoosier Auto Company, recently incorporated at Garrett, Ind., will build and equip a factory at that place for the manufacture of automobiles, motors and gasoline engines.

The American Agricultural Chemical Company is adding to its plant on Babcock street and the Erie Railroad, Buffalo, a one-story brick machine shop and motor building.

The Capitol Brass Works, Detroit, Mich., has let contracts for its new four-story and basement factory, 50 x 128 ft., to be erected corner Franklin and Cheney streets.

The Storage Battery & Lighting Company of Chicago has secured a site at Niagara Falls, N. Y., on land formerly occupied by the Acetyvone Company and the Citizens' Lumber Company, and will erect and equip a large manufacturing plant on same in the spring. In the meantime buildings now on the property will be remodeled for use of the company and manufacturing operations will be commenced about March 1.

The Lotz Auto Company, recently incorporated at Detroit with $300,000 capital, has secured a site and will build a manufacturing plant at Harper avenue and the Belt Line Road.

The Chalmers-Detroit Motor Company, Detroit, Mich., manufacturer of automobiles, has acquired about 6 acres of additional land adjoining its plant at Jefferson avenue and the Belt Line Railroad and will build an extensive addition at once.

The Attwood Brass Company, Grand Rapids, Mich., recently mentioned in *The Iron Age*, will not put up a new building. This company is in the market, however, for polishing machinery and alternating current motors.

The Worth Motor Car Company, Kankanee, Ill., has practically postponed the erection of its proposed plant until spring. This is largely due to the severe cold weather prevailing.

At a recent meeting of the stockholders of the Conneaut Shovel Company, Conneaut, Ohio, G. W. Benton was re-elected general manager, secretary and treasurer, and it was decided to start at once rebuilding its plant which was burned. The new plant will be of brick and much larger than the old building. A line of strap back shovels will be added to the specialties formerly manufactured by this company. The company is in the market for a line of presses, shafting, &c.

Stove Molding Machine Operators and the Apprentice Ratio.

Reference has already been made to the fact that the annual conference of representatives of the Stove Founders' National Defense Association and the Iron Molders' Union of North America at Chicago in December, resulted in the continuance of the wage rate of last year throughout 1910. An important matter on which no agreement was reached was the proposal contained in the following resolution introduced on behalf of the stove founders:

As machine operators are not necessarily skilled molders, they should not be reckoned in the apprentice ratio of members of the S. F. N. D. A., and we urge the exemption of men operating machines from said ratio.

The following brief report of the discussion on this resolution and of the action taken is given by the *International Molders' Journal:*

Mr. Cribben: We have found it impossible to operate our molding machines with any degree of success with molders, and our members feel that it is not fair that we should put our apprentices on the machines, or employ men to operate them and include them in the apprentice ratio. We desire to employ men who will only operate the machines and designate them as machine operators. There are a number of that class of men employed outside of stove foundries. We believe apprentices should be taught the molding end of the business, and as the machines do not require skill of any kind we feel that the best results on the machines can be obtained by operating them with common ordinary laborers.

Other representatives speaking from experience stated that no success can be obtained on the molding machines with journeymen molders, and that this class of work should be done by men who would be known as machine operators.

Mr. Keough: We find that in some instances the manufacturers have made an honest effort to run the molding machine and failed to make it a success—we also have made an honest effort in that direction and failed. I have told some of the manufacturers to make any kind of a demonstration—in fact do anything they pleased—to demonstrate the utility of the machine, and when ready we would try to price the work. We made an agreement with you on the machine which we consider is fair, and I cannot believe that your proposition is a fair one, as it would increase the number of molders that will be out of work. You will soon shut down and as it has happened during the past year you will employ your apprentices and let our men walk the streets.

Mr. Valentine: We are not prepared to take up this matter now and come to any settlement, and I think we had better let it go for another year and possibly better results may be obtained.

Mr. Cribben demanded that a vote be taken on the proposition of using machine operators to work upon molding machines who would not be included in the apprentice ratio. The vote being taken, resulted in a tie vote and the chair declared it lost.

The Lackawanna Steel Company Statement.

The following statement is made of the income of the Lackawanna Steel Company and its subsidiaries for the last six months of 1909, with comparison with the last six months of 1908. It shows a surplus of $1,268,737 in the second half of last year, as contrasted with a deficit of $280,776 in the last six months of 1908:

	For six months ending December 31, 1909.	1908.
Net income from manufacturing and operating, after deducting ordinary repairs and maintenance and interest on bonds and fixed charges of subsidiary companies	$3,110,959.06	$1,283,249.58
Earnings on investments in companies not controlled, and other annual income	160,920.88	45,462.24
Totals	$3,271,879.94	$1,328,711.82
Less charges and appropriations for the following purposes:		
Sinking funds on bonds of subsidiary companies	378,682.10	328,615.26
Mines exhaustion funds	147,271.10	74,779.60
Depreciation and accruing renewals	663,439.51	456,093.48
Total deduction	$1,189,392.71	$859,488.34
Net earnings	$2,082,487.23	$469,223.48
Deduct interest for six months on Lackawanna Steel Company bonds and notes outstanding	813,750.00	750,000.00
Surplus for six months	$1,268,737.23	*$280,776.52
Unfilled orders at close of periods, gross tons	467,533	205,236

* Deficit.

The U. S. Reduction Company, 531 Lowe avenue, Chicago, is removing its plant to East Chicago, Ind. A tract of 4 acres has been acquired, with buildings ready for occupancy, but the company plans to erect additional buildings. The business is smelting and refining metals, chiefly aluminum and babbitt metals. The capacity of the new plant will be double that of the old works and a cupola will be erected to supplement the crucible operations which have been carried on heretofore. After February 1 the company will have an office in the Manhattan Building, 315 Dearborn street, Chicago, and the old plant on Lowe avenue will be maintained as a warehouse for local trade and shipments from stock.

The Iron and Metal Trades

While recent developments in the iron market have not been pronounced enough to suit the most optimistic, the majority in the trade who looked for a period of waiting after the feverish buying in the late fall of 1909 are not disappointed. It is plain that the expansion of railroad demand, of which great things are expected, waits until a more settled situation is evolved from the turmoil at Washington.

Activity in pig iron is growing and is more strongly emphasized by the quietness in finished material. In some quarters producers are showing more desire to get business; on the other hand, as foundries are taking contracts which will employ them well along in the second half of the year they are negotiating for pig iron for the second half.

In the Buffalo market, in which considerable business was done a fortnight ago at prices attractive to buyers, large inquiries are now up for pig iron to be delivered in the last half to important foundry interests in New York State. Cincinnati reports a stronger pig iron market with heavy buying of malleable Bessemer for the first half of the year. At Chicago 10,000 to 15,000 tons of Southern iron and about 10,000 tons of Northern were sold.

On Southern iron $14, Birmingham, for No. 2 is still the basis for deliveries over the third quarter, and $14.50 for the last quarter. In view of the advance of 50 cents on Lake Superior non-Bessemer ores and on contract coke the largest Southern sellers are firmer in their views, believing that the increase in cost to their Northern competitors will bring the parity nearer to the basis of last fall for Southern iron.

Basic iron has been a feature in the eastern Pennsylvania market, sales of 15,000 to 20,000 tons being reported for the third quarter at $18.75, delivered. Considerable sales of low phosphorus irons have been made through Philadelphia for delivery in New England and in western Pennsylvania at the equivalent of $23 in the Philadelphia District for 0.03 per cent. iron.

In the Pittsburgh market a large lot of Eastern Bessemer pig iron is reported to have been offered at a price below the Valley furnace basis of $19.

While much railroad buying is held up, orders for a total of 5500 cars have been placed by the Cincinnati, Hamilton & Dayton, the Nickel Plate and the Toledo & Ohio Central. Orders are pending for 15,000 more, including 8000 to 10,000 in the Chicago District, as indicated by inquiries for 70,000 tons of plates and shapes.

The principal rail orders of the week amount to 40,000 tons booked at Chicago. The Missouri, Kansas & Texas bought 14,000 tons, the Harriman lines 3500 tons and the Texas Central 2000 tons. A part of the B. & O. order is said to have been placed.

Bids are asked on a bridge over the Ohio River for the Louisville & Nashville and the Baltimore & Ohio at Louisville, Ky., calling for 8000 tons. Chicago reports that in addition to 200,000 tons of structural steel involved in live projects under consideration in tributary territory, prospects which have not taken definite form amount to 200,000 tons more.

Western implement manufacturers are embarrassed by delayed deliveries on special shapes and on bars of certain sections. Demand has been increasing more rapidly than mill capacity, and orders placed last year have been greatly added to recently.

The New York Board of Water Supply has closed a contract for seven siphons to be built in Westchester county, requiring 5400 tons of plates.

New orders in the wire trade are not so heavy nor is the scale of mill operations so large. An advance in wire products is looked for in the next 30 days.

The city of Chicago will buy 5700 tons of water pipe in February.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Jan.19, 1910.	Jan.12, 1910.	Dec.15, 1909.	Jan.20, 1909.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	$19.00	$19.00	$19.00	$17.25
Foundry No. 2, Southern, Cincinnati	17.25	17.25	17.25	16.25
Foundry No. 2, local, Chicago	19.00	19.00	19.00	17.35
Basic, delivered, eastern Penn.	18.75	18.75	18.75	16.75
Basic, Valley furnace	17.00	17.00	17.00	15.50
Bessemer, Pittsburgh	19.90	19.90	19.90	17.40
Gray forge, Pittsburgh	17.40	17.40	17.40	15.40
Lake Superior charcoal, Chicago	19.50	19.50	19.50	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	27.50	27.50	27.50	25.00
Forging billets, Pittsburgh	31.00	31.00	31.00	27.00
Open hearth billets, Philadelphia	30.60	30.60	30.60	26.20
Wire rods, Pittsburgh	33.00	33.00	33.00	33.00
Steel rails, heavy, at mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	*17.00*	17.25	17.25	14.50
Steel rails, melting, Philadelphia	*17.00*	17.00	18.00	16.75
Iron rails, Chicago	20.00	20.00	20.00	18.50
Iron rails, Philadelphia	20.50	20.50	20.50	21.25
Car wheels, Chicago	18.50	18.50	18.50	15.50
Car wheels, Philadelphia	17.50	17.50	17.50	16.00
Heavy steel scrap, Pittsburgh	*17.50*	17.75	18.25	16.50
Heavy steel scrap, Chicago	16.00	16.00	16.00	14.00
Heavy steel scrap, Philadelphia	*17.00*	17.00	18.00	16.75
FINISHED IRON AND STEEL,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia	*1.60*	1.65	1.65	1.55
Common iron bars, Chicago	1.60	1.60	1.60	1.50
Common iron bars, Pittsburgh	1.70	1.70	1.70	1.50
Steel bars, tidewater, New York	1.66	1.66	1.66	1.56
Steel bars, Pittsburgh	1.50	1.50	1.50	1.40
Tank plates, tidewater, New York	1.71	1.71	1.71	1.76
Tank plates, Pittsburgh	1.55	1.55	1.55	1.60
Beams, tidewater, New York	1.71	1.71	1.71	1.76
Beams, Pittsburgh	1.55	1.55	1.55	1.60
Angles, tidewater, New York	1.71	1.71	1.71	1.76
Angles, Pittsburgh	1.55	1.55	1.55	1.60
Skelp, grooved steel, Pittsburgh	*1.50*	1.50	1.60	1.45
Skelp, sheared steel, Pittsburgh	*1.60*	1.60	1.65	1.50
SHEETS, NAILS AND WIRE,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.40	2.40	2.40	2.50
Wire nails, Pittsburgh*	1.85	1.85	1.85	1.95
Cut nails, Pittsburgh	1.85	1.85	1.80	1.75
Barb wire, galv., Pittsburgh*	2.15	2.15	2.15	2.40
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	14.00	14.12½	13.75	14.50
Electrolytic copper, New York	13.75	13.87½	13.50	13.75
Spelter, New York	*6.25*	6.25	6.40	5.10
Spelter, St. Louis	*6.10*	6.12½	6.25	4.95
Lead, New York	4.70	4.70	4.60	4.20
Lead, St. Louis	4.60	4.65	4.52½	4.05
Tin, New York	*32.75*	32.85	32.80	28.00
Antimony, Hallett, New York	8.25	8.25	8.25	8.00
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	$3.84	$3.84	$3.74	$3.89

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel F.O.B Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier, 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.55c., net; I-beams over 15 in., 1.65c., net; H-beams over 8 in., 1.75c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.60c., net; angles over 6 in., 1.65c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.75c., base, half extras, steel bar card; tees, 3 in. and up, 1.65c., net; zees, 3 in. and up, 1.60c., net; angles, channels and tees, under 3 in., 1.50c., base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.80c., net; hand rail tees, 2.80c., net; checkered and corrugated plates, 2.80c., net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.55c. to 1.60c., base. Extras over this price are as follows:

Tank, ship and bridge quality, ¼-in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered ¼-in. plate. Steel plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel plates over 72 in. wide, ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under ¼-in. to and including 3-16-in. plates on thin edges	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
All sketches (excepting straight taper plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete circles	.20
Boiler and flange steel plates	.10
"A. B. M. A." and ordinary firebox steel plates	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Shell grade of steel is abandoned.	
For widths over 100 in. up to 110 in	.05
For widths over 110 in. up to 115 in	.10
For widths over 115 in. up to 120 in	.15
For widths over 120 in. up to 125 in	.25
For widths over 125 in. up to 130 in	.50
For widths over 130 in	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.30c. f.o.b. Pittsburgh.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Black annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c.; Nos. 15 and 16, 1.95c. Box annealed sheets, Nos. 17 to 21, 2.20c.; Nos. 22 to 24, 2.25c.; Nos. 25 and 26, 2.30c.; No. 27, 2.35c.; No. 28, 2.40c.; No. 29, 2.45c.; No. 30, 2.55c. Galvanized sheets, Nos. 13 and 14, 2.50c.; Nos. 15 and 16, 2.60c.; Nos. 17 to 21, 2.75c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3.10c.; No. 27, 3.30c.; No. 28, 3.50c.; No. 29, 3.60c.; No. 30, 3.85c. Painted roofing sheets, No. 28, $1.70 per square. Galvanized roofing sheets, No. 28, $3 per square, for 2½-in. corrugations.

Wrought Pipe.—The following are the discounts on the Pittsburgh basing card on carloads of wrought pipe which went into effect January 1:

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
⅛ and ¼ in	70	54	65	..
⅜ in	71	57	66	52
½ in	74	62	69	57
¾ to 6 in	78	68	73	63
7 to 12 in	72	57	68	53
Plugged and Reamed.				
1 to 4 in	76	66	71	61
Extra Strong, Plain Ends.				
⅛ to ⅜ in	63	51	58	46
⅛ to 4 in	70	58	65	53
4½ to 8 in	66	54	61	49
Double Extra Strong, Plain Ends.				
½ to 8 in	59	48	54	43

The above steel pipe discounts are for "card weight," subject to the usual variation of 5 per cent.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1½ in	49	43
1¾ to 2¼ in	61	43
2½ in	63	48
2¾ to 5 in	69	55
6 to 13 in	60	43

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads to destinations east of the Mississippi River will be sold at delivered discount for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, $33.

Steel Rivets.—Structural rivets, 2.15c., base; boiler rivets, 2.25c., base, subject to usual extras.

Pittsburgh.

PARK BUILDING, January 19, 1910.—(*By Telegraph.*)

Pig Iron.—A feature of the market is the offering of a large block of Eastern Bessemer for delivery in this district at a concession under the price of $19, which has been the price at Valley furnaces of such iron for some little time. So far as known, nothing has been done with the offer, as local consumers are pretty well covered. In fact, no large lots of local Bessemer have been sold in this market recently. In the absence of any important transactions, the whole pig iron market is decidedly firm, and it is believed that a buying movement will start in a short time. There is a moderate inquiry for foundry and basic iron, but only for small lots for early shipment. We quote standard Bessemer iron, $19, for delivery over first half; basic, $17, for delivery in first quarter; malleable Bessemer, $17.25; No. 2 foundry, $17, and gray forge, $16.50, all at Valley furnace, the freight rate to the Pittsburgh District being 90c. a ton.

Steel.—Quite an active inquiry is coming out for small sizes of open hearth billets, and several sales ranging from 200 to 500 tons of 2½-in. have been made at prices as high as $31, maker's mill. There is a little freer offering of Bessemer billets and reports are in circulation that several small lots of resale billets has been sold at $27, Pittsburgh. This price, however, would not be named by any of the mills, all of them being very much behind in deliveries. The consumption of sheet and tin bars is enormously heavy at present and consumers are still having trouble in getting deliveries as needed. We quote $27.50 for Bessemer billets and $28 to $28.50 for open hearth, maker's mill; sheet and tin bars for first quarter $29, maker's mill; forging billets, $31 to $32, maker's mill.

(*By Mail.*)

In the steel market the quietness existing for several weeks is more pronounced, and there is some uneasiness. It is pointed out, however, that in November and December consumers specified heavily against contracts, and their stocks are larger now than at any time for some months. These stocks have been taken in at prices lower on most lines than are ruling now, and will have to be at least partially worked off before much new demand will develop. The leading steel mills are well filled up for this quarter and have a good deal of business engaged for the second quarter, especially on sheets and tin plate, while the structural and plate mill books are also well filled. The pipe mills likewise have good orders, so that in most finishing branches the mills will not suffer for orders for some little time. The higher cost of making pig iron and the continued scarcity of steel would also seem to indicate that prices will not show any decline in the first quarter at least. It is believed that early in February, or not later than March, we will have a good buying movement, as the country is absorbing steel products at an enormous rate. While pig iron and steel are dull, prices are showing a stability that is surprising. Bessemer and open hearth billets are still scarce and are bringing full prices. Coke and scrap are quiet, and prices on both are soft. Consumers are pretty well covered for some time ahead and are out of the market at present. Liberal purchases of material by the railroads in the early spring are expected, and when they start to place contracts for the supplies they so badly need the whole steel market will quickly take on renewed activity.

Ferromanganese.—Consumers are well covered; hence there is not much new inquiry. We note sales of about 50 tons for prompt shipment at $44, seaboard, the freight to Pittsburgh being $2.30 a ton. We quote 80 per cent. foreign at $44 to $44.50, Baltimore, for delivery over first quarter, and about $45 for delivery in second quarter.

Ferrosilicon.—Prices are fairly strong, although the inquiry is light. We quote 10 per cent. at $23.90; 11 per cent., $24.90; 12 per cent., $25.90, and 50 per cent., $62 to $62.50, Pittsburgh, for prompt shipment.

Muck Bar.—With absolutely no new inquiry and no sales in this market for some time, we quote best grades of muck bar made from all pig iron at $30, Pittsburgh, in random lengths, and $30.25 for bar cut to lengths.

Rods.—Consumers are specifying liberally on their contracts for rods placed some time ago, but there is little new buying. The market is firm and the available supply of rods for the open market is limited. We continue to quote Bessemer, open hearth and chain rods at $33, Pittsburgh, for forward delivery.

Skelp.—Some inquiries are in the market for both grooved and sheared iron skelp, but there is not much doing in steel. Prices are firm and the mills are pretty well filled up for first quarter. We quote grooved steel skelp at 1.50c. to 1.55c.; sheared steel skelp, 1.60c. to 1.65c.; grooved iron skelp, 1.75c. to 1.80c., and sheared iron skelp, 1.90c., all for ordinary widths and gauges, f.o.b. Pittsburgh.

Steel Rails.—No important contracts for standard sections have been placed, the total orders of the Carnegie Steel Company last week being about 5000 tons, made up of small orders. Orders were received last week for about 2500 tons of light rails. We quote steel axles at 1.75c. to 1.80c., and splice bars, 1.50c., at mill, Pittsburgh. Light rail prices are as follows: 8 to 10 lb., $32; 12 to 14 lb., $29; 16, 20 and 25 lb., $28; 30 and 35 lb., $27.75, and 40 and 45 lb., $27, Pittsburgh. These prices are for 250-ton lots and over, and for small lots premiums of 50c. per ton and more are being paid. We quote standard sections at $28, at mill.

Plates.—Some car orders have been placed and large inquiries are in the market. The Pressed Steel Car Company has received an order from the Cincinnati, Hamilton & Dayton Railroad for 500 all steel gondola cars to be built at its works at Woods Run, and the same road has placed orders for 500 steel gondola cars with the Ralston Steel Car Company, 500 steel gondola cars with the Cambria Steel Company, and 1000 steel underframe box cars with the American Car & Foundry Company. The Norfolk & Western is in the market for about 2500 cars, made up of hoppers, coke and box cars. The larger plate mills are still behind in deliveries, but some of the smaller mills are in position to make reasonably prompt shipments. The market is firm, and we quote ¼-in. and heavier plates at 1.55c. in large lots and 1.60c. to 1.65c. in small lots for prompt shipment.

Structural Material.—No important contracts have been placed the past week, but the leading structural concerns are well filled up for the first half of this year, and in some cases are refusing to bid on some of the work coming out, stating that it is being taken at prices that do not

allow a profit. The mills are making a little better deliveries, but are not yet furnishing material as fast as consumers would like to have it. We quote beams and channels up to 15-in. at 1.55c., at mill, while small lots for spot shipment bring 1.60c. to 1.65c., at mill.

Tin Plate.—The demand for tin plate keeps up well. The mills have recently taken some nice contracts for delivery through the first half, and the tin plate mills seem assured of full work for that much of this year at least. Specifications against contracts are coming in freely. The American Sheet & Tin Plate Company is steadily increasing the output at its plants. It has just put the New Castle Works on a tonnage basis, the men having been paid day rates heretofore. The company is operating a little more than 85 per cent. of its serviceable capacity. The market is firm. We quote 100-lb. cokes at $3.60 per base box, f.o.b. Pittsburgh, for delivery through the first quarter and half.

Sheets.—Heavy orders for black and galvanized sheets continue to be placed. The demand for blue annealed and electrical sheets is also very active, some of the smaller mills asking an advance of about $1 a ton for prompt deliveries on the latter. A company making iron sheets reports that it has recently taken some nice orders, one contract calling for about 700 tons. It is believed that this year will be the biggest in demand that the sheet trade has ever known. A good deal of new producing capacity will be available within the next few months. We quote: Blue annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c., and Nos. 14 and 15, 1.95c.; one-pass box annealed No. 28 black sheets, 2.40c., and No. 28 galvanized, 3.50c., at mill. We quote corrugated roofing sheets at $1.70 per square for painted and $3 for galvanized, 2½-in. corrugations. Jobbers charge the usual advances over these prices for small lots from store.

Bars.—The mills are not catching up on back deliveries of bars to any extent, and there is a good deal of complaint from consumers. Specifications from implement makers are very heavy at present, breaking all records. Some of them have recently come in the market again and have placed additional heavy contracts, finding that the orders given out last year will not see them through. All the mills rolling both iron and steel bars are pretty well filed up through this quarter and have a good many orders for shipment in second half. On contracts for delivery through first and second quarters several of the leading steel bar mills are naming 1.45c., at mill, but for prompt shipment 1.50c. to 1.55c. is being quoted. Iron bars are quite firm and are held at about 1.70c., Pittsburgh.

Hoops and Bands.—New orders are fairly active, and consumers are specifying liberally against contracts. Prices are very firm. We quote steel hoops for forward delivery at 1.50c. to 1.60c., and for prompt shipment at 1.60c. to 1.65c., at mill. Steel bands are 1.45c. to 1.50c., on contracts, and from 1.60c. to 1.65c. for prompt shipment.

Spelter.—The market is firm and there are more inquiries than for some time. We quote prime grades of Western at 6.10c., East St. Louis, equal to 6.22½c., Pittsburgh, and note sales of about 150 tons at that price.

Spikes.—No large orders are being placed, but an active new demand is expected in the early spring, and some inquiries have already come out. Considerable new track laying is expected to be done by the railroads this year, and the spike makers are looking forward to an active business as soon as such work can be started. We quote standard sizes of railroad spikes, 4½ x 9-16 in. and larger, at $1.75 to $1.80 for first quarter. Boat spikes are firm, at $1.80, base, and small railroad spikes at $1.80, base. These prices are for carload and larger lots, 10c. per keg advance being charged for small lots.

Shafting.—The demand is still quiet, but consumers are specifying liberally on their contracts placed some time ago. Discounts on shafting remain on the basis of 55 per cent. off in carloads and 50 per cent. in less than carloads, delivered in base territory.

Rivets.—There is a fair run of small orders, but most consumers covered some time ago, and are specifying fairly well against these orders. We quote: Structural rivets, ¾ in. and larger, 2.15c., base; cone head boiler rivets, ¾ in. and larger, 2.25c., base; ⅝ in. and 11-16 in. take an advance of 15c., and ½ in. and 9-16 in. take an advance of 50c.; in lengths shorter than 1 in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill. The above prices are absolutely minimum on contracts for large lots, makers charging the usual advances of $2 to $3 a ton to the small trade.

Wire Products.—There is not much new buying of wire nails or wire, consumers having placed contracts some time ago at lower prices, but they are specifying quite freely against these orders. An active demand for barb wire and fence wire is expected when spring trade opens, which will be in the next month or six weeks. We quote wire nails at $1.85 in carload and larger lots; painted barb wire, $1.85; galvanized, $2.15; annealed fence wire, $1.65; galvanized, $1.95, and cut nails, $1.85, all f.o.b. cars, Pittsburgh, usual terms, with full freight to destination added.

Merchant Pipe.—The Wichita Natural Gas Company has placed orders this week for about 21 miles of pipe, ranging in size from 6¼ up to 18 in. The general demand for pipe is rather quiet, all the jobbers having large stocks that will carry them over the next month or six weeks. Some large projects for carrying gas and oil are under way, which, if put through, will require a large amount of line pipe in the larger sizes.

Boiler Tubes.—A fairly large volume of new business is being place in locomotive and merchant tubes, and the mills have more orders on their books at present than for some time. We are advised that discounts are being firmly held.

Iron and Steel Scrap.—The market continues quiet, consumers being pretty well covered. The market is fairly strong when the lack of new demand is considered. For heavy steel scrap the usual asking price is $17.75, but in some cases as low as $17.50 is being done, notably in the Sharon, Pa., District. We quote heavy steel scrap for delivery at Monessen, Steubenville, Sharon, Follansbee and Pittsburgh, at about $17.50 to $17.75. On other grades dealers quote about as follows: No. 1 cast scrap, $16.50; No. 2, $15.50; bundled sheet scrap, $15.75 to $16; rerolling rails, $18.25 to $18.50, for delivery at Cumberland Md., Newark and Columbus, Ohio; railroad malleable scrap, $15.75 to $16; grate bars, $12.75 to $13; No. 1 busheling, $15.25; No. 2, $11.75; low phosphorus melting stock, $21; iron axles, $20.50 to $20.75; steel axles, $21.25 to $21.50; locomotive axles, $27.75 to $28; old car wheels, $17.75 to $18; No. 1 railroad wrought scrap, $18.50 to $18.75; cast iron borings, $10.25 to $10.50, with no consumers wanting this material; sheet bar crop ends, $18.50 to $18.75, and machine shop turnings, $12.25 to $12.50, all per gross ton, f.o.b. Pittsburgh.

Coke.—There is but little new demand for either furnace or foundry coke, and prices are rather weak. Standard grades of furnace coke for spot shipment have sold as low as $2.50 per net ton, at oven. The output of coke in the Upper and Lower Connellsville regions broke all records last week, amounting to 449,471 net tons.

Chicago.

FISHER BUILDING, January 19, 1910.—(*By Telegraph.*)

Milder weather this week has enabled the railroads to move coal that had been snowbound in their yards and sidings and relieves for the present the fear of a serious fuel shortage. Another week of drifting snow would have closed many factories. While the tension has been relieved, the railroads are congested, and a large percentage of locomotives have been put out of service for the present by the severe work of bucking snow drifts. Delays of steel in transit at a time when the mills were already behind in shipments are proving serious. There seems to be no real shortage in plain soft steel bars, as evidenced by the fact that the mills rolling hard steel and iron bars which are able to make deliveries in a few weeks have had no rush of buying from customers in distress. On odd sections and special shapes like plow beams, the shortage is more pronounced, as fewer mills are equipped to supply this material, and it is probable that agricultural consumers of crucible and special steel will not be able to get enough to cover their record breaking requirements for their spring trade. Purchases of rails from Western mills continue at a very satisfactory rate, keeping up the average of $1,000,000 worth of business a week, which Chicago mills have maintained for the past six months in rails and track supplies. Inquiries are pending from Western roads for steel cars, which will make 100,000 tons of business for plate and structural mills, an inquiry for 70,000 tons of steel for this purpose having appeared in addition to 30,000 tons reported last week. The fabricators have at least six months' work under contract, with projects under estimate and in prospect which assure them a full year's business. In wire products the jobbing trade is well supplied, but manufacturing buyers complain of slow deliveries on their heavy specifications for rods and plain wire. Old material continues quiet.

Pig Iron.—The pig iron market showed much improvement the past week. Sales of Southern iron amounted to 10,000 to 15,000 tons in this territory in scattered lots of 1000 tons and less, with one or two sales exceeding this figure. Perhaps a third of the business done was in high silicon grades, No. 1 or higher, which were generally figured on the basis of $14, Birmingham, for No. 2. In some cases high silicon iron was sold on this basis by furnace interests which refuse $14 for regular No. 2 foundry. Several lots of Southern off grade iron were sold by analysis. Only a small portion of the business done during the week was in regular foundry grades. The minimum price reported for No. 2 is $14, Birmingham. In Northern iron the dullness that has prevailed for two months was relieved by several sales of a fair size. A Chicago malleable foundry took 2000 tons of malleable Bessemer for last half, and several 1000

ton lots for first half were sold to Western malleable foundries, with good inquiries still pending. One buyer took 2000 tons of charcoal malleable. A little foundry iron was sold at Milwaukee for local first half delivery there. But in the Chicago market the inquiries and business done were principally in malleable Bessemer, of which the sales for the week aggregated at least 10,000 tons, nearly all for first half. There are many inquiries for last half, but furnaces are reluctant to quote, as they figure that the advance in ore, extras in dock charges, advances in freight and other costs will make the cost of production $1.50 higher for last half iron than the present cost. A new steel plant in Chicago has bought 3000 tons of low phosphorus, following an initial purchase of 5000 tons of basic some time ago. The following prices are for January, February and March delivery, f.o.b. Chicago:

Lake Superior charcoal	$19.50 to $20.00
Northern coke foundry, No. 1	19.50 to 20.00
Northern coke foundry, No. 2	19.00 to 19.50
Northern coke foundry, No. 3	18.50 to 19.00
Northern Scotch, No. 1	19.00 to 19.50
Southern coke, No. 1	18.85 to 19.35
Southern coke, No. 2	18.35 to 18.85
Southern coke, No. 3	17.85 to 18.35
Southern coke, No. 4	17.60 to 18.10
Southern coke, No. 1 soft	18.85 to 19.35
Southern coke, No. 2 soft	18.35 to 18.85
Southern gray forge	17.35 to 17.85
Southern mottled	17.10 to 17.60
Malleable Bessemer	19.00 to 19.50
Standard Bessemer	21.40 to 21.90
Jackson Co. and Kentucky silvery, 6%	21.40 to 21.90
Jackson Co. and Kentucky silvery, 8%	22.40 to 22.90
Jackson Co. and Kentucky silvery, 10%	23.40 to 23.90

(*By Mail.*)

Billets.—Consumers are still dependent upon offerings of odd lots from Eastern mills, as only a few large buyers are able to cover their requirements by regular contracts. Odd lots of forging billets have sold as high as $36, Chicago, and consumers pay $40 and upward for special analysis billets.

Rails and Track Supplies.—Orders for standard rails taken in Chicago last week amounted to about 40,000 tons. While information is not available here, it is believed that this included a part of the Baltimore & Ohio contract, along with 14,000 tons from the Missouri, Kansas & Texas Railroad and 3500 tons of Bessemer rails for Harriman lines. Of the 40,000 tons sold, only 11,500 tons were open hearth. A notable feature of the rail trade this winter is that there is less complaint of breakage than in severe winters a few years ago. At that time the railroads had become very precise in their specifications as to sections and the methods to be followed by the mills. In many cases the mill men protested against poorly balanced rails, which they were required to roll, but the railroad officials insisted upon having their own way. In the last two or three years, however, they have been more willing to accept advice from the experts of the mills, with the result that they are getting better rails, and nearly every breakage that occurs can be traced to bad wheels, which create a greater strain than the rail was made to carry. Railroad men are becoming more and more interested in steel refined by the new electric furnace at the South Works. Rails made from this steel which have been tested on curves and track subjected to hard usage have shown almost incredible resistance to tests which are beyond the strength of Bessemer rails or even open hearth. The refining process can be carried to any degree of purity desired in the electric furnace, and the rail is free from pipes, blowholes, hard spots and other defects which originate in the ingot under old processes. Specifications continue very heavy for track supplies. We quote standard railroad spikes at 1.80c., base; track bolts and square nuts, 2.40c. to 2.60c., base, all in carloads, Chicago. Light rails, 40 to 45 lb., $26; 30 to 35 lb., $26.75; 16, 20 and 25 lb., $27; 12 lb., $28, Chicago, less 50c. a ton on lots of 500 tons and $1 a ton on lots over 500 tons.

Structural Material.—The largest contract reported in the Chicago market for last week was 2600 tons for the Memphis Cotton Exchange, at Memphis, Tenn. This will be fabricated in the Memphis shop of the Virginia Bridge Company. Additions to the shops of the American Car & Foundry Company, at St. Charles, Mo., will require 800 tons, this contract having gone to the Kenwood Bridge Company. The Plew Building, Chicago, has been cut down to 320 tons, which will be furnished by the Union Foundry Company, using Bethlehem sections. The Great Northern Railway has contracted with the Wisconsin Bridge Company, Milwaukee, Wis., for 260 tons for a draw span bridge. The metallurgical building for the Colorado School of Mines, Golden, Colo., 225 tons, went to the M. J. Patterson Construction Company, Denver. Western mills are as far behind as ever in deliveries, but prices are more regular, and the leading interest is getting a larger share of the business than in December. We quote plain material from mill, 1.78c. to 1.88c., Chicago; from store, 2c., Chicago.

Plates.—Confidential inquiries for plates and car material last week amounted to about 70,000 tons, and these, with similar inquiries since the first of the year, indicate that the car builders are figuring on 8000 or 10,000 steel cars for Western roads. The mills in this district are taking care of the tank plate business, but it is evident that they will not be able to handle all the car plate tonnage that is coming on from Western roads. The majority of the large railroad systems expect to replace their present wooden equipment with steel cars or steel underframes, and it will be necessary for the steel interests to build more plate mills to supply this demand. Prices are necessarily very firm. We quote mill prices at 1.78c. to 1.88c., Chicago; store prices, 2c., Chicago.

Sheets.—While there is a good deal of complaint among consumers regarding deliveries of sheets, the local independent mill has kept its business pretty will in hand excepting on blue annealed sheets. On galvanized it is only four weeks behind, on black sheets six to eight weeks, but on blue annealed sheets the business in hand will require four or five months to work out. A fair volume of new business has been coming forward this month. We quote mill prices as follows, Chicago: No. 10 blue annealed, 1.93c.; No. 28 black, 2.58c.; No. 28 galvanized, 3.68c. Prices from store, Chicago, are: No. 10 blue annealed, 2.25c. to 2.35c.; No. 28 black, 2.90c. to 3c.; No. 28 galvanized, 4c. to 4.10c.

Bars.—The agricultural implement manufacturers are growing more strenuous in their complaints regarding deliveries of bars. The mills have been rolling more bars than ever before in the history of the trade, but the demand has increased more rapidly than mill capacity. In many cases large consumers who thought they had covered their requirements for a year when they contracted last summer have come back and bought 40 and 50 per cent. more. The mills were already behind in deliveries and the breakdown in freight traffic caused by severe weather and heavy snows has set consumers back a week or two farther by delays in transit. If implements are not in the hands of the retail distributer at the time the farmer wants them he will patch up his old ones and the trade is lost for the season; hence the peculiar urgency of the requests from implement manufacturers for deliveries of steel. The greatest delay is on odd sections in bars and on special shapes, like plow beams. If conditions were as bad on plain bars there would be a rush to buy hard steel and iron bars as substitutes. There have been a few inquiries for these products from people who are evidently short of soft steel, but not enough to indicate any famine in plain bars. Subject to the usual delay in delivery on soft steel bars, we quote as follows: Soft steel bars, 1.68c. to 1.78c.; bar iron, 1.60c. to 1.65c.; hard steel bars rolled from old rails, 1.60c. to 1.65c., all Chicago.

Rods and Wire.—Another general advance is generally expected within the next 30 days in prices of wire products. Complaints regarding deliveries are not so numerous in the wire trade as in other branches of the steel industry. The jobbers are well supplied with stocks for the hardware trade, and in some cases have requested the mills to hold back their shipments of nails and barb wire, but manufacturing consumers are not so well supplied, and those using rounds and rods have difficulty in many cases in keeping their plants in operation. The car shortage is causing a good deal of trouble, and the shortage of motive power is even more serious, affecting the movement of materials from one plant to another, which in many cases restricts production. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.83c.; wire nails, 2.03c.; painted barb wire, 2.03c.; galvanized, 2.33c., all Chicago.

Merchant Steel.—It is becoming evident that the supply of special steels for agricultural purposes will not be equal to the demand, which has broken all records of former years. The implement manufacturers bought liberally last summer on their yearly contracts, and have placed second and third orders for all they could get from the mills they have relied on in the past. Many of them are now looking around in despair to find some further source of supply. In many cases the failure to obtain a few pounds of special steel will lose the sale of an implement worth $25 to $50, with corresponding disappointment to the manufacturer who cannot get steel until the season is over. In some cases like harrow disks the present shortage will merely postpone the trade until fall, and this may be true also of plows. The farmer will have to get along somehow this spring until the mills making agricultural steel can increase their capacity.

Cast Iron Pipe.—The market has been very quiet the past week, with no lettings reported of any moment. Routine inquiries are fair considering weather conditions, and good inquiries are coming in regarding large lettings, which will come up in the near future. The city of Chicago will buy 5700 tons of water pipe early next month, and other cities will come into the market in the near future. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., $28.50; 6 to 12 in., $27.50; 16-in. and up, $26.50, with $1 extra for gas pipe.

Metals.—There is a fair current demand in the jobbing trade for all the metals, although the inquiry for copper is somewhat irregular on account of the fluctuations in price. Casting and lake copper are both quoted ⅛c. lower and pig tin is ¼c. lower. Spelter has been sold as low as 6.10c.,

Chicago, to large consumers, but on carload lots the weakness is not so pronounced. We quote as follows: Casting copper, 13⅝c.; lake, 14⅛c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, car lots, 33½c.; small lots, 35c.; lead, desilverized, 4.75c. to 4.80c., for 50-ton lots; corroding, 5c. to 5.05c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.15c. to 6.20c.; Cookson's antimony, 10⅜c., and other grades, 9¾c. to 10¼c.; sheet zinc is $8, f.o.b. La Salle, in car lots of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13¾c.; copper bottoms, 12c.; copper clips, 13½c.; red brass, 12½c.; yellow brass, 10c.; light brass, 7c.; lead pipe, 4½c.; zinc, 5.25c.; pewter, No. 1, 23c.; tin foil, 26c.; block tin pipe, 28c.

Old Material.—The scrap market is in a peculiar condition. Old established dealers say they have never known a time in the history of the Chicago market when the actual delivery and movement of scrap were so light as at present. Two years ago when the market was considered extremely dull after the panic there was more material in transit than at present. There is not much difficulty in disposing of scrap which the dealer is able to deliver, and quite a business is being done on paper with consumers and with country dealers for future shipment. The railroads are having so much difficulty to move coal and other necessary freight that they take no interest in hauling scrap. The Great Northern offered a list of 7000 or 8000 tons last week, about half rails. It is known that bids were rejected on the rails, but what disposition was made of the other material is not reported. If sold, it would not be likely to reach this market before March or April for actual disposition. There is a good demand for steel scrap, and one lot of 1500 tons of shoveling steel was sold last week to an open hearth interest at $16. Fortunately consumers generally have stock to carry them through the winter. If there were much demand for spot material the market would be very erratic. Inquiries for a few hundred tons of cast scrap for immediate delivery recently caused an advance of nearly $1 a ton. Consumers of wrought scrap are more willing to buy, especially where dealers will make contracts for deferred delivery, and prices are a shade better. Locomotive tires are actively sought, and there is also a better demand for pipes and flues, which are now cut to charging box length and sold for open hearth steel scrap. The following prices are per gross ton, delivered, Chicago:

Old iron rails	$20.00 to $20.50
Old steel rails, rerolling	18.00 to 18.50
Old steel rails, less than 3 ft	17.00 to 17.50
Relaying rails, standard sections, subject to inspection	23.50 to 24.50
Old car wheels	18.50 to 19.00
Heavy melting steel scrap	16.00 to 16.50
Frogs, switches and guards, cut apart	16.00 to 16.50
Shoveling steel	15.50 to 16.00

The following quotations are per net ton:

Iron angles and splice bars	$17.50 to $18.00
Iron car axles	21.50 to 22.00
Steel car axles	20.50 to 21.00
No. 1 railroad wrought	15.00 to 15.50
No. 2 railroad wrought	13.75 to 14.25
Springs, knuckles and couplers	14.75 to 15.25
Locomotive tires, smooth	19.00 to 19.50
No. 1 dealers' forge	12.50 to 13.00
Steel axle turnings	11.50 to 12.00
Machine shop turnings	10.50 to 11.00
Cast and mixed borings	7.50 to 8.00
No. 1 busheling	12.75 to 13.25
No. 2 busheling	9.75 to 10.25
No. 1 boilers, cut to sheets and rings	11.50 to 12.00
No. 1 cast scrap	15.00 to 15.50
Stove plate and light cast scrap	12.50 to 13.00
Railroad malleable	15.00 to 15.50
Agricultural malleable	13.00 to 13.50
Pipes and flues	11.75 to 12.25

Philadelphia.

PHILADELPHIA, PA., January 18, 1910.

A heavier movement in pig iron occurred the past week. Steel making grades were more active, a round lot of basic selling for third quarter delivery, while considerable low phosphorus iron was also sold. A moderate movement in foundry grades was also noted. Finished materials are not particularly active. In some lines a fairly good business in small lots has come out, but, on the whole, the general situation has been quiet. Makers of both crude and finished materials have a good volume of business on their books. In some instances deliveries are delayed, and there is no disposition on the part of sellers to force business. Prices in all lines are well maintained. Quotations on finished materials are firm, while no concessions from current figures can be had on the standard brands of pig. Billets and sheets are in good demand, and leading makers in this territory have advanced prices of sheets for first quarter delivery one-tenth cent a pound. Coke is a trifle easier, particularly for prompt lots, and there is a somewhat wider range of quotations, dependent on quality. No movement is perceptible in heavy steel scrap, but rolling mill grades of old material have advanced slightly.

Pig Iron.—Quite an extensive movement in the steel making grades has developed. The demand for basic iron, which has been extremely quiet for some time, has opened up, and it is believed will become more active in the near future. One Eastern melter purchased 15,000 tons for third quarter delivery at $18.75, delivered. Low phosphorus iron has been more active, one interest reporting sales aggregating about 9000 tons, principally for delivery in New England and western Pennsylvania. Selling prices were equivalent to $23 for 0.03 iron delivered in this vicinity. There is still some inquiry for low phosphorus iron which it is expected will develop into business in the near future. Foundry grades have been a trifle more active, but the demand still lacks the usual snap. Further sales of low grade foundry irons have been made to the cast iron pipe foundries in this vicinity, which interests will take still further quantities at satisfactory prices. Some 1500 to 2000 tons of low grade iron have been reported sold during the week. In the higher grades sales range from carloads to lots of a few hundred tons. A little better run of small orders for prompt shipment is noted, while further inquiries for larger blocks for extended delivery have come out. Business in foundry iron, however, still moves rather slowly. Prices on standard brands are being well maintained, and some makers talk higher quotations. Less is heard of possible concessions, standard brands being firm at $19, delivered, for No. 2 X for first half shipment. Virginia foundry irons are being more freely sold at a shade lower. This, however, is not due to any weakness among sellers, who maintain firmly the $16 furnace price for No. 2 X, but is due to a lower freight rate. On February 7 a reduction of 25 cents a ton will become effective in the all-rail rate to New England; while on February 15 a readjustment of the rate to points in this territory from some furnaces will be made, by which several interests will have a reduction of 25 cents a ton, and in the early spring a further like readjustment is expected to be made from those points to New England, placing the majority of the Virginia furnaces on the same freight rate basis. The present readjustment will permit the reduction of 25 cents a ton in the delivered price in this territory on several brands of Virginia iron, as a result of which a somewhat better volume of business has been done, sales ranging from 300 to 1000 tons, principally No. 2 plain iron, having been made, delivery on which begins about the middle of February. Virginia 2 X is now flatly on the basis of $19, delivered in this vicinity. Southern iron continues inactive as far as sales in this territory are concerned. Gray forge iron has been sold in moderate lots at unchanged prices; one fair sized quantity to an Eastern rolling mill is also reported. The general tone of the market is strong; in many cases deliveries are being urged and buyers are beginning to show a greater tendency to come into the market. Quotations on all grades are well maintained, the following range of prices being named for standard brands delivered in buyers' yards in this vicinity during the next three or four months:

Eastern Pennsylvnia, No. 2 X foundry	$19.00
Eastern Pennsylvania, No. 2 plain	$18.50 to 18.75
Virginia, No. 2 X foundry	19.00
Virginia, No. 2 plain	18.50 to 18.75
Gray forge	17.75 to 18.00
Basic	18.75
Low phosphorus	22.75 to 23.25

Ferromanganese.—The market continues inactive. A few sales of carload lots have been reported at $45, Baltimore, but no business of importance has developed. For deliveries extending over various portions of the year $44.50 to $45.50, Baltimore, is nominally quoted.

Billets.—The demand still continues active, although orders have been mostly for small lots. Good inquiry continues to come from the West. Mills are well booked ahead, in some instances into the second quarter, for which considerable business has been taken at unchanged prices. Prompt shipments are less easy to obtain, and makers are getting premiums ranging from $2 to $3 a ton for small spot lots. Ordinary rolling steel for delivery during the first half is quoted at $30, Eastern mill, equal to $30.60, delivered in this vicinity. Forging steel is active, more business being offered than mills in this territory can take care of. Quotations, under the circumstances, have an upward tendency, $33 to $36, Eastern mill, being named, according to tonnage, specification and delivery.

Plates.—A good day to day business continues to be taken by the Eastern mills. Individual orders are usually of moderate size, but the aggregate reaches a fair total. Mills are fully engaged, are not forcing business, and, as a rule, refuse to make contracts for extended deliveries. Considerable business of good proportions is in sight, and makers take quite an optimistic view of the future. Prices are being well maintained, ordinary plates, for delivery during the next three or four months, commanding from 1.75c. to 1.80c., delivered in this territory, dependent on specifications.

Structural Material.—The volume of business placed during the week was not very heavy. Orders were usually of a miscellaneous character, although quite a good volume of new business is under consideration by mills and fabricators. Mills are well engaged, having a comparatively satisfactory amount of work on their books. Prices are firm, 1.75c. to 1.80c. being quoted, according to specification, for plain shapes, delivered in this vicinity.

Sheets.—A large volume of business is being offered the mills and in some cases orders for early shipment have had to be refused. Makers have been unable to catch up with deliveries since the holiday shutdown and refuse to accept business for delivery beyond the first quarter. Owing to the increased demand producers have advanced prices for delivery during the first quarter, the following range now being quoted: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3c.; No. 27, 3.10c.; No. 28, 3.20c.

Bars.—The demand for refined iron bars has been less active and prices have shown a little weakness, particularly on the part of some of the smaller mills, which now quote 1.60c., delivered in this vicinity. The leading producers, however, maintain prices with comparative firmness at 1.65c. to 1.70c., delivered, and, in instances, even higher quotations have been named. Steel bars are still quoted at 1.65c. to 1.70c., delivered in this vicinity, although deliveries cannot be had in some cases for six months ahead.

Coke.—The market has an easier tone. Makers of standard brands hold prices fairly well, although less well-known brands can be had at a concession. A sale of a moderate lot of furnace coke for early delivery is reported at $2.50, at oven. Foundry coke has sold in small lots at prices ranging from $3 to $3.25, at oven. We quote as follows per net ton, delivered in buyers' yards in this vicinity:

Connellsville furnace coke	$4.75 to $5.00
Foundry coke	5.25 to 5.50
Mountain furnace coke	4.35 to 4.60
Foundry coke	4.85 to 5.10

Old Material.—A little movement has developed in rolling mill grades, prices of which have advanced slightly on moderate sales. The fact that little scrap is coming to the yards, owing to continued unfavorable weather conditions, has also stiffened other grades. Heavy melting steel is quiet. While embargoes have been lifted at one or two steel mills, they are takiug in practically no material. At the price offered by the associated mills for heavy melting steel, $17, delivered, no scrap is coming out. The following range of quotations, which, however, are still largely nominal, is named for deliveries in buyers' yards, eastern Pennsylvania and nearby points:

No. 1 steel scrap and crops	$17.00 to $17.50
Old steel rails, rerolling	18.00 to 18.50
Low phosphorus	23.00 to 23.50
Old steel axles	23.00 to 24.00
Old iron axles	28.00 to 29.00
Old iron rails	20.50 to 21.50
Old car wheels	17.50 to 18.00
No. 1 railroad wrought	19.75 to 20.25
Wrought iron pipe	16.75 to 17.25
No. 1 forge fire	16.00 to 16.50
No. 2 light iron	10.25 to 10.75
Wrought turnings	14.50 to 15.00
Cast borings	12.50 to 13.00
Machinery cast	17.00 to 17.50
Railroad malleable	16.75 to 17.25
Grate bars	14.50 to 15.00
Stove plate	13.50 to 14.00

H. K. Curtin & Co. have opened an office at 836 Real Estate Trust Building, Philadelphia, and will engage in business as iron and steel merchants. H. K. Curtin was formerly connected with the late firm of Andrew J. Curtin & Son, which discontinued business after the death of Andrew J. Curtin.

Cleveland.

CLEVELAND, OHIO, January 18, 1910.

Iron Ore.—A large tonnage of non-Bessemer ore was sold during the week, although the buying was not as heavy as in the previous two weeks. As the bulk of the tonnage has already been sold, the market will be less active from now on. During the early part of the buying movement Eastern furnace companies showed no interest in Lake Superior ores, but in the past few days considerable tonnage of non-Bessemer has been sold to such interests, particularly in eastern Pennsylvania. The market is firm, regular prices being maintained by all interests. The market for siliceous ore has opened up, considerable tonnage being sold during the week at an advance of 20c. to 25c. a ton over the prices that prevailed last year. Ore shipments from the Lake Erie docks are good, particularly on Bessemer. Ore shippers came into the market this week for vessel tonnage and heavy contracts were placed. Ore rates have finally been definitely fixed at an advance of 5c. a ton over last year. The unloading charge has been reduced from 20c. to 15c. a ton, making a net advance for the vesselmen 10c. a ton. This will make their net charge for moving ore the same as prevailed in 1907, before the carrying charges were cut 10c. a ton. The carrying rates are now fixed at 70c. a ton from ports at the head of Lake Superior, 65c. from Marquette and 55c. from Escanaba. We quote prices as follows: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesaba non-Bessemer, $4.

Pig Iron.—One northern Ohio furnace interest has opened its books for the third quarter and last half and during the week has sold considerable tonnage of both foundry and malleable iron for those deliveries at an advance of from 25c. to 50c. a ton over first half prices. Some producers are willing to take orders for the third quarter, but others decline as yet to make quotations for delivery beyond July 1. Not enough foundry iron for the last half has been sold to establish a market and some furnacemen have not reached a decision regarding what prices should be for that delivery, but the opinion is pretty general that, taking in consideration the higher price for ore and somewhat cheaper coke, the minimum advance should not be less than 50c. a ton over present prices. One local interest is asking $18, at furnace, for No. 2 foundry for the third quarter, and a Valley interest is quoting No. 2 foundry at $17.50 for the second and third quarter. In this immediate territory the demand shows some improvement, but the market is still comparatively quiet. We note the sale of 500 tons of No. 2 foundry to a local foundry at $17.75, delivered, for the first half. The sale was made by a local furnace, which shaded its recent quotations to meet Valley competition. Valley furnaces continue to quote No. 2 at $17 for the first half. Some inquiries are coming out for additional iron from foundries that previously bought, but find that they will need more for the first half. Local interests report a large volume of inquiries for foundry iron for the last half from Eastern consumers. An Ohio engine builder is in the market for 600 tons for the last half. For prompt shipment and first quarter delivery we quote, delivered, Cleveland, as follows:

Bessemer	$19.90
Northern foundry, No. 1	$18.25 to 18.50
Northern foundry, No. 2	17.75 to 18.00
Northern foundry, No. 3	17.25 to 17.50
Gray forge	17.15 to 17.40
Southern foundry, No. 2	18.35
Jackson County silvery, 8 per cent. silicon	21.55

Coke.—The market continues quiet. Consumers of both grades are covered with contracts, and the only demand is for small lots of foundry coke. We quote standard Connellsville furnace coke at $2.60 to $2.70 per net ton, at oven. Connellsville 72-hour foundry coke is held at $3 to $3.25 for spot shipment and $3.25 to $3.35 for the first half.

Finished Iron and Steel.—The general situation continues satisfactory, except in the matter of deliveries, which show no improvement except in structural material. A good volume of specifications is being received on first quarter steel bar contracts, particularly from the local bolt manufacturers, some of whom are in the market for their second quarter requirements. A fair amount of other new business is coming out in carload orders, and over for steel bars. For future delivery steel bars are quoted at 1.50c., Pittsburgh, the market being firm at that price. For early delivery orders are being taken at 1.60c., Pittsburgh. There is a good volume of inquiry for plates and structural material from fabricating shops for first half requirements. One local structural shop placed a contract for 3000 tons of structural material during the week. The demand for shapes and plates in small lots for quick delivery, which fell off just before the holidays, has become quite active, and orders are being taken at 1.60c., Eastern mill. For future delivery we quote plates and structural material at 1.60c., Pittsburgh. Considerable structural work has come out during the week. The Goodyear Tire & Rubber Company, Akron, Ohio, has let contracts for two new buildings, one requiring 1700 tons, to the Cambria Steel Company, and another, 700 tons, to T. H. Brooks & Co., Cleveland. Brooks & Co. have also taken 500 tons for buildings for the Peerless Motor Car Company, Cleveland, and the latter company has received bids for 500 tons additional for a power house. Bids will be received shortly by the city of Cleveland for 1500 tons for grade crossing elimination work in Cleveland. Plans are being prepared for an addition to the Rockefeller Building, which will require about 2200 tons. Considerable railroad bridge work in northern Ohio is being figured on. There is a good demand for forging billets, for which local consumers are placing orders at $32 to $33, Eastern mill, for carloads and over for delivery in from one to three weeks. The demand for sheets continues active, and consumers are having trouble in getting desired deliveries. Mills are getting good specifications on iron bars, and some new business is coming out. We quote iron bars at 1.60c. to 1.65c., Cleveland.

Old Material.—The demand for scrap shows no improvement. Shipments are somewhat better, mills now taking scrap that was held back a few weeks ago; but they are not yet buying for future delivery. Dealers generally are doing but little buying at present. Many have large stocks on hand which they are holding for an advance. The demand for cast scrap holds up fairly well. The market continues rather weak, with most price quotations, which are largely nominal, unchanged. Dealers are asking 50c. more for cast scrap, and stove plate, which has become scarce, has advanced. Prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$16.25 to $16.75
Old iron rails	20.00 to 20.50
Steel car axles	20.50 to 21.00
Old car wheels	17.00 to 17.50
Heavy melting steel	16.00 to 16.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	14.50 to 15.00
Railroad malleable	16.50 to 17.00
Light bundled sheet scrap	11.00 to 11.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$21.00 to $21.50
Cast borings	8.75 to 9.00
Iron and steel turnings and drillings	10.50 to 10.75
Steel axle turnings	12.00 to 12.50
No. 1 busheling	14.00 to 14.50
No. 1 railroad wrought	16.50 to 17.00
No. 1 cast	15.00 to 15.50
Stove plate	12.75 to 13.25
Bundled tin scrap	11.00 to 11.50

Cincinnati.

CINCINNATI, OHIO, January 19, 1910.—(*By Telegraph.*)

Conditions are more settled in all divisions of the iron and steel trade and the feature of the week has been the consideration of prices for the last half. Considerable business is under negotiation between furnacemen and consumers. Sales agencies look for some definite move on the part of the furnace people, particularly those of the South, in the matter of opening of books for business beyond July 1, within the next two weeks. The trade is on the qui vive for news from the meeting of directors in New York Tuesday of the leading pipe interest, for it is expected that a considerable tonnage of Southern low grade irons will be contracted for and, perhaps, a price established for third and possibly fourth quarter. Coke is firm and scrap is dull.

Pig Iron.—The situation, particularly in Southern foundry irons, is considerably stronger this week. The news of a change of two large Southern furnaces from foundry to basic, and the official notice of withdrawal to-day of a large interest in the southern Ohio field on malleable strengthen the situation in both districts. There has been some heavy buying of malleable for shipment over the first half, and the price has been rather uniformly $17, Ironton. Southern No. 2 foundry has been sold into the third quarter at $14, Birmingham, but there appears to be nothing better than $14.50 for last quarter business. A large Springfield, Ohio, manufacturer has bought about 1200 tons of malleable, all Ohio irons. A sale of car wheel irons was made on Monday for southern Ohio delivery at $17, Ironton, for second and third quarter. No shading of current prices is heard of, save a resale in northeastern Ohio of nearly 1000 tons of Alabama iron at $13.75, Birmingham, for first half. For third quarter alone, furnaces in southern Ohio are holding firmly for $17.50, Ironton, for No. 2, and concessions of about 25c. are heard of for Alabama irons for this period in conjunction with first half or second quarter. There are not many new inquiries, but considerable business is in negotiation. A pump manufacturer in Michigan is asking prices on some No. 2 Southern, high in phosphorus; some stove manufacturers are feeling the market, and a number of jobbing foundries in the Central States are inquiring for deliveries ranging from March to October. A large stove manufacturing interest in Michigan has just bought between 2000 and 3000 tons for second quarter. Forge irons seem to be a trifle stronger, and $13, Birmingham, is about the minimum level, although it is believed there is some of this iron in negotiation to-day for $12.75. A large tonnage of malleable was sold on Monday to a south central Ohio manufacturer for the last half at about $17.50, Ironton. Southern basic is quotable at $14, Birmingham, and furnaces in that district are not inclined to capitulate easily, believing there is a strong future market for these steel making irons, with but medium sized stocks available. For the first three or four months $17.25 is being done in Valley basic and $17 is available for prompt iron. For prompt shipment and during the first half, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati as follows:

Southern coke, No. 1 foundry	$17.75
Southern coke, No. 2 foundry	17.25
Southern coke, No. 3 foundry	16.75
Southern coke, No. 4 foundry	16.50
Southern coke, No. 1 soft	17.75
Southern coke, No. 2 soft	17.25
Southern gray forge	16.25
Mottled	15.75
Ohio silvery, 8 per cent. silicon	$20.70 to 21.20
Lake Superior coke, No. 1	18.70
Lake Superior coke, No. 2	18.20
Lake Superior coke, No. 3	17.70
Standard Southern car wheel	24.75 to 25.25
Lake Superior car wheel	21.75 to 22.25

(*By Mail.*)

Coke.—The situation, aside from the Connellsville District, where it is reported a little easier, is much the same as last week. There is a trifle more disposition to seek business in the field mentioned, although prices have not as yet varied to any appreciable extent. Connellsville furnace grades are obtainable at from $2.65, spot, per net ton, at oven, up to $3 over the year, contracts being written at a range of about $2.80 to $3. Wise County furnace grades are quotable at $2.10 to $2.25 and foundry $3 to $3.50, the former being the spot price. Deliveries from all districts are improving.

Sheets.—There is practically no improvement in deliveries, and mills are running unusually full for this season of the year, with a definite place for every pound of the product. This is true of both the leading interest and the other producers, some of the latter being able to command from 50c. to $1 per ton premium for quick shipments, which is interpreted at these times to mean 20 to 30 days. Specifications on contracts are quite heavy, which is taken as an excellent sign. The quoted price, f.o.b. Cincinnati, on No. 28 black sheets is 2.55c.; galvanized, No. 28, 3.65c.; painted roofing sheets, corrugated, 1.82c.; galvanized, 2½-in. corrugations, 3.13c., these prices being on carload lots. The usual advance is charged for smaller lots.

Structural Material.—There is little large business in sight. Some twisted steel bars will be required for the new office building to be erected on Fourth street, Cincinnati, by J. G. Schmidlapp, but the tonnage will not be large or important. A new theatre building in the central Cincinnati shopping district is talked of. President George M. Verity of the American Rolling Mill Company states that contracts have been let for grading, excavation and for a large part of the machinery of his new plant, and that work is to commence within the next two or three weeks.

Steel and Iron Bars.—Specifications on contracts are coming in freely, and some of the large agricultural and car building concerns in this territory are feeling the market for steel bars, and there has been some buying for second quarter additional requirements. The order of the Cincinnati, Hamilton & Dayton Railroad this week for 1500 steel cars is pleasing to the sales agencies; 1000 of these cars will come from the Cambria Steel Company and 500 from the Pressed Steel Car Company. Deliveries are to commence in April.

Old Material.—Although the storm bound condition of things in other parts of the country materially affected the movement of scrap and pushed the price up considerably in some districts, no change of importance is noted here. Yards of all selling interests here are well filled, as were those of the consuming interests from heavy accumulations when the price was at rock bottom during the late summer and fall. Since the stiffening up of Southern foundry iron, dealers note a little increase of interest in cast scrap. There have been some inquiries from Eastern territory for heavy melting steel, but transactions have not been notably large. We quote dealers' prices to the trade, f.o.b. Cincinnati and southern Ohio buyers' yards, as follows:

Heavy melting steel	$16.50 to $17.00
Low phosphorus steel	20.00 to 21.00
No. 1 railroad wrought	17.25 to 17.50
No. 1 railroad and machinery cast scrap	16.50 to 17.00
Old steel axles	20.50 to 21.00
Old iron axles	26.00 to 26.50
Old car wheels	17.50 to 18.00
Railroad malleable	17.00 to 17.50
Boiler plate	14.50 to 15.00
Locomotive grate bars	13.00 to 13.50
Pipe	14.00 to 14.50
Wrought iron and soft steel turnings	10.50 to 11.00
Clean cast iron borings	9.00 to 9.25
No. 1 busheling scrap	14.00 to 14.50

The Whitney-Kemmerer Company, with general offices at Pittsburgh, has opened a branch office at 1006 First National Bank Building, Cincinnati, in charge of C. C. Hayward. The general manager of the company is Charles S. Bygate, until recently general sales agent of the Pickands-Magee Company, Pittsburgh. For the present it is stated that the business will consist chiefly of the handling of Wise County and Connellsville coals and coke. Mr. Hayward was formerly identified at different times with Matthew Addy and Co. and Walter Wallingford & Co.

St. Louis.

ST. LOUIS, January 17, 1910.

Correspondents of the leading financial institutions of the city, mostly of the Southern and Western States, advise that a record breaking commerce for 1910 is confidently expected. The total value of the crops of Louisiana for last year is $105,000,000 and Oklahoma's crops were of record breaking value. There is a fair demand for money, and rates are steady at 5 to 6 per cent. The receipts at the St. Louis Post Office for the first 12 days of 1910 were $25,400 ahead of last year. The leading car and foundry company has started up its second plant at East St. Louis.

Coke.—The market for coke has been a disappointment for sellers, who very generally expected the demand to show a marked improvement last week. Usually at this season large buyers come into the market with inquiries for round lots for shipment over the entire year. Though doubtless some large consumers are well stocked for the present, there are others who may be counted on for business in the near future. A fair inquiry continues from small buyers, with sales of carloads and upward. Leading sellers, however, state that producers are not anxious to take on contracts for delivery beyond the first half on the basis of the prices current. In the absence of a more active demand no appreciation in prices seems likely until it sets in in the larger consuming districts. We continue quotations for 72-hour standard brands Connellsville foundry at $3 for prompt and

$3.35 to $3.40 for shipment over the first half, per net ton at oven.

Pig Iron.—None of the leading sellers report any large inquiries or sales for the week. Some of the offices had iron men for callers, who were sounding market conditions, and they claimed a disposition to await developments, seeming to feel there was no occasion for haste in anticipating their wants, though the brokers pointed to the increased cost of around $2 per ton on Northern iron after July 1 owing to advices of higher ore, coke and freights which it was likely would sympathetically act on Southern iron and cause an advance in prices. It is reported that the mines of some of the leading Birmingham interests are flooded, and also that nearly half of the furnaces are out of blast. Taken altogether these factors tend to firmness in spite of the dullness of the market. It is also stated that some leading furnacemen require sales to be made subject to confirmation, and that few brokers are offering round lots firm except for merchant iron. The only inquiry noted is for 300 tons of No. 1 soft, though some offices report a fairly good demand from small consumers. There is an undercurrent of firmness, which seems likely to gather strength from week to week, now that the stock taking and yearly balancing work is over, especially as it is known that mills and foundries in this district are very busy and are urgently requiring specifications to be filled as promptly as possible. We continue quotations for Southern No. 2 foundry for shipment over the first half at $14, Birmingham; Southern Ohio, $17 to $17.50, f.o.b. furnace.

Finished Iron and Steel.—The leading interest reports that there is no appreciable let-up in the demand covering the entire list, except in structural material, owing to the winter season. Standard rails show some improvement in demand, especially from the Southwest. For light rails the inquiry is moderate. For bar iron and steel there is a good call from agricultural implement manufacturers, with some business doing with jobbers, which trade, however, is curtailed somewhat by weather conditions. Track material is in excellent demand.

Lead, Spelter, &c.—The demand for lead is good and the market is steady at 4.65c. Spelter is dull and weaker at 6.05c., East St. Louis. Zinc ore is steady at $48 per ton, Joplin base. Tin is off 30c. per 100 lb.; antimony unchanged; copper is 5c. per 100 lb. lower. The demand for finished metals is about as usual at this season.

Old Material.—Such business as is passing is practically confined to dealers. Notwithstanding the lack of demand from consumers, some of the large dealers are holding at some advance in price with respect to a part of the list. Absence of railroad offerings, small stocks and a confident feeling, together with the disposition to make prices as attractive as possible to holders and induce larger offerings, may be given as the reasons for this course, particularly as a more active market is believed to be close at hand. There is some inquiry from Eastern buyers. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

Old iron rails	$16.50 to $17.00
Old steel rails, rerolling	15.50 to 16.00
Old steel rails, less than 3 ft.	14.50 to 15.00
Relaying rails, standard sections, subject to inspection	25.00 to 25.50
Old car wheels	17.50 to 18.00
Heavy melting steel scrap	14.50 to 15.00
Frogs, switches and guards, cut apart	14.50 to 15.00

The following quotations are per net ton:

Iron fish plates	$14.50 to $15.50
Iron car axles	20.50 to 21.00
Steel car axles	19.50 to 20.00
No. 1 railroad wrought	15.50 to 16.00
No. 2 railroad wrought	14.50 to 15.00
Railway springs	13.00 to 13.50
Locomotive tires, smooth	16.00 to 17.00
No. 1 dealers' forge	11.50 to 12.00
Mixed borings	8.00 to 8.50
No. 1 busheling	13.00 to 13.50
No. 1 boilers, cut to sheets and rings	11.00 to 11.50
No. 1 cast scrap	13.50 to 14.00
Stove plate and light cast scrap	10.00 to 10.50
Railroad malleable	12.00 to 12.50
Agricultural malleable	9.50 to 10.00
Pipes and flues	10.50 to 11.00
Railroad sheet and tank scrap	9.50 to 10.00
Railroad grate bars	10.50 to 11.00
Machine shop turnings	10.50 to 11.00

The Robinson Fire Apparatus Mfg. Company, St. Louis, has filed a statement increasing its capital stock from $50,000 to $130,000.

The State Geologist reports that the mineral values of Missouri for the past year will no doubt reach a total of $40,000,000.

By a chattel deed of trust Joseph L. Freasier was appointed trustee for the creditors of the General Compressed Air & Vacuum Company. It has a capital stock of $750,000 and was said to have been doing a large business.

The Steel Roof Truss Company has been incorporated; capital stock fully paid up, $25,000; incorporators Julius N. Koehler, Henry A. Fergusson, Francis H. Kremming.

Owing to the ice gorge in St. Louis harbor, damage has occurred during the past week to the extent of about $200,000 to river craft, wharf boats and dredging plants.

Birmingham.

BIRMINGHAM, ALA., January 15, 1910.

Pig Iron.—The past week was practically a repetition of the week before in the matter of sales, but considerably in the lead as to inquiries. In the Birmingham District there is a total of four stacks out of commission, which has necessarily cut down materially the rate of production. In the light of this fact alone buyers seem to realize the real situation and are not only making actual purchases, but are feeling for third quarter and second half business. Three of our largest producers are now practically out of the market so far as solicitations are concerned. A total of 4000 tons was booked by one interest during the week on the basis of $14.50 for No. 2, at the furnace. This was for second quarter delivery. Another sold 800 tons; still another 200 tons, and scattering sales aggregating some 300 to 400 tons were made. During the first part of the week quite a little iron could be bought for prompt shipment at $14, at the furnace, but by the middle of the week, and particularly the closing days, the tonnage materially narrowed down for such price. Some merchant iron is available at $14 for prompt shipment only, and limited tonnage. On the whole the week closed with much more satisfactory conditions than had obtained for some weeks. One or two lots of gray forge iron were sold, which commanded 25c. per ton premium over the No. 2 foundry base. There is but little low grade iron to be had in the South, and as soon as odd lots are thrown on the market they are promptly bought. Very satisfactory conditions prevail in the Southern charcoal iron market and sales continue to be made covering round tonnages. The prevailing price is $22.50, with strong tendency toward $23 per ton, at the furnace.

Cast Iron Pipe.—Small lots of water pipe continue to be sold, but no large lettings of any consequence have yet come up. In fact, the season is not ripe for them. Manufacturers here have intimation of good prospective business on which their salesmen and representatives have their eyes, so to speak. Several municipal contracts in the South are in sight, which will represent some good home consumption. The following prices are firm, per net ton, f.o.b. cars here: 4 to 6 in., $25; 8 to 12 in., $25; over 12 in., average $24, with $1 per ton extra for gas pipe.

Old Material.—The past week has shown some strength in the scrap iron market, but no advance in prices. While the pig iron market is somewhat more active, it has not reached the stage to materially affect scrap prices. Dealers are inclined to hold on, shipping now and then a carload. One of the principal dealers here reports that his Southern trade has been such recently as to take care of his stocks—hence no shipments have been made to the East and Middle West. We quote dealers' asking prices as follows per gross ton, f.o.b. cars here:

Old iron axles	$20.00 to $20.50
Old iron rails	16.00 to 16.50
Old steel axles	19.00 to 19.50
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	12.00 to 12.50
No. 1 country wrought	11.50 to 12.00
No. 2 country wrought	11.50 to 12.00
No. 1 machinery	13.00 to 13.50
No. 1 steel	12.25 to 12.75
Tram car wheels	12.50 to 13.00
Standard car wheels	14.50 to 15.00
Light cast and stove plate	10.50 to 11.00

Buffalo.

BUFFALO, N. Y., January 18, 1910.

Pig Iron.—A large number of inquiries, including many for heavy tonnages from prominent consumers, have been received the past week, principally for last half delivery. The active inquiries now under consideration will aggregate 80,000 to 90,000 tons, foundry and malleable, most of which will in all probability crystalize into orders. This is an amount of new business almost unprecedented for the season, when, on account of inventory and weather conditions, new orders are usually somewhat slack. Notwithstanding the restricting effect of the inventory period, shipments on contracts called for by foundries in tributary territory is very heavy, and the ratio at which iron is going forward from furnaces is exceptionally large for January; the daily aggregate for the Buffalo District furnaces being about 3000 tons. The market has a strong upward tendency, and in the opinion of furnacemen in this district prices for pig for last half delivery are likely to register a sharp advance in the near future; for the reason that the cost of production will materially increase when new ore comes in while an increase in coke is already operative. They estimate the enhanced cost of production at $2 or more per ton above last year's cost, some putting the increase at $2.25 to $2.50, and on a strong market the furnaces will not be disposed to absorb all if any of the increase in cost of production. General quoting prices are $17.50 to $18 for malleable, $18 to $18.25 for No. 1 X foundry, $17.50 to $18 for No. 2 X, and $17 to $17.50 for No. 2 plain, first half, with 25c. to 50c. addi-

tional for last half. The following schedule approximately represents the market for prompt and last three quarters deliveries:

No. 1 X foundry	$18.00 to $18.25
No. 2 X foundry	17.50 to 18.00
No. 2 plain	17.00 to 17.50
No. 3 foundry	17.00 to 17.25
Gray forge	16.75 to 17.00
Malleable	17.75 to 18.25
Bessemer	19.50 to 19.75
Basic	18.25 to 18.75
Charcoal	20.50 to 21.00

Finished Iron and Steel.—Orders for finished products are increasing since the turn of the year, and specifications on contracts have been coming in at increased ratio the past week. A large volume of inquiries is being received for bar mill lines, shapes and plates, and the signs are pointing to an early placing of specifications for spring requirements. A leading interest has closed several contracts at established prices, covering material going into construction work. Fabricated prices are showing an improvement of $3 to $4 per ton, indicating that the low priced tonnage has been exhausted or taken into stock, and this material being eliminated from the market, future quotations will be on a higher basis. The agency of the principal interest reports that the Canadian trade, which has not heretofore kept pace with the domestic, is awakening to the fact that requirements must be anticipated and orders placed further in advance to avoid embarrassment being suffered on account of extended deliveries caused by the heavy domestic bookings. The aggregate of business for Canadian export in structural plates and bars for the week was very large. The Lackawanna Steel Company is to furnish the steel for the addition to the shops of the Merchants' Dispatch Transportation Company at East Rochester, 250 tons, which the Lackawanna Bridge Company is to fabricate and erect. Bids are being received this week for the steel for the car repair shops to be erected at the plant of the Jacob Dold Packing Company, Buffalo, requiring a small tonnage.

Old Material.—The market is in a state of stagnation so far as most lines are concerned, such little business as is being transacted being with mills requiring specialties or small lots of some particular line. Some mills are cleaning up contracts, but the larger portion are still maintaining shipping embargoes until the closing of inventories and the clearing of the scrap situation. Prices are nominal and unchanged from last week, there not being sufficient business to establish values. We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$16.50 to $17.00
Low phosphorus steel	20.00 to 21.00
No. 1 railroad wrought	17.25 to 17.50
No. 1 railroad and machinery cast scrap	16.50 to 17.00
Old steel axles	20.50 to 21.00
Old iron axles	26.00 to 26.50
Old car wheels	17.50 to 18.00
Railroad malleable	17.00 to 17.50
Boiler plate	14.00 to 14.50
Locomotive grate bars	13.00 to 13.50
Pipe	14.00 to 14.50
Wrought iron and soft steel turnings	10.50 to 11.00
Clean cast borings	9.00 to 9.25
No. 1 busheling scrap	14.00 to 14.50

New York.

NEW YORK, January 19, 1910.

Pig Iron.—Business in this district has been light, the greater part of the inquiry received locally in the week being for more distant points. The New England foundry trade is quite generally supplied with iron for the first and part of the second quarter, but considerable additional buying is expected soon for the latter period. Reports continue of concessions on stray lots of Virginia iron. Cast iron pipe works have been in the market for iron for early delivery and have found some sellers willing to make concessions. Inquiries for the last half of the year are increasing, but buyers are taking their time, apparently not looking for immediate advances. We quote New York delivered prices on Northern iron for the first half of the year as follows: No. 1, $19 to $19.50; No. 2 X, $18.75 to $19; No. 2 plain, $18.50 to $18.75. Southern No. 1 is quoted at $19 to $19.25; Southern No. 2 at $18.50 to $18.75.

Steel Rails.—The Delaware & Eastern is expected to place shortly its order for 12,000 tons, pending for some months. A portion of the Baltimore & Ohio order is reported placed, and recent buying has included 14,000 tons for the Missouri, Kansas & Texas and 2000 tons for the Texas Central. Western contractors are making inquiry for a round lot, announcing also that foreign mills will be asked to quote.

Finished Iron and Steel.—While the business taken so far this year is small, orders have aggregated rather more than for corresponding periods of former years, and so far it has not affected any reduction in the activity of the mills. Some look for an increase in new business at the end of the month, and others not before the middle of February. The stocks of manufacturers and jobbers are reported to be low, and some considerable buying in the near future would seem to be inevitable. Several small orders for bridge material from the railroads have been placed, which foot up quite a fair total and others are pending. One of the largest of the latter is that for a bridge across the Ohio River, to be used jointly by the Louisville & Nashville and the Baltimore & Ohio railroads. It will require about 8000 tons. For another Baltimore & Ohio bridge the McClintic-Marshall Construction Company will fabricate 750 tons and the American Bridge Company 1400 tons. The latter has the Pennsylvania Railroad's order for 200 tons of bridge material. Another bridge order has been given by the Philadelphia & Reading Railroad, 230 tons, to L. Shoemaker & Co., and 75 tons to the Pennsylvania Steel Company. The New York, New Haven & Hartford is in the market for 400 tons for a bridge. The structural material for the Haywood Bros. & Wakefield loft building, 3500 tons, has finally been awarded to the American Bridge Company. This company will also furnish 2500 tons for additional construction work at the Grand Central terminal, New York City. The contract for the 5000 tons to be needed for the new plant of the Davenport Locomotive Works, Davenport, Iowa, has not yet been placed, and the 1500 tons for the Third National Bank Building, at Atlanta, Ga., is still in the market. The 60,000 tons which it is estimated will be required for the Quebec bridge may not be placed for two or three months. The American Bridge Company will furnish the 1900 tons for the substructure of the Vine street pier at Philadelphia. The McClintic-Marshall Construction Company will fabricate 750 tons for the open hearth building at Ensley of the Tennessee Coal, Iron & Railroad Company. The general contract for the first section of the New York Post Office, to be erected near the new Pennsylvania terminal has been awarded to the George A. Fuller Company. This will be but a part of one side of the ultimate quadrangular building, and will possibly take about 3000 tons which has not yet been placed. The contract for 600 tons for a new shop of the American Car & Foundry Company, at St. Charles, Mo., has gone to a Western fabricator. About 5400 tons of 7-16 and ½ in. plates will be required for some New York Board of Water Supply work. Bids were opened Tuesday. D. Peoples was the low bidder, $1,181,000, the East Jersey Pipe Company second and Breauchaud & Winston third. The work includes the construction of seven riveted steel siphons 9 ft. 9 in. and 11 ft. 3 in. nominal inside diameter to be enveloped in concrete and lined with Portland cement mortar, aggregating 2.6 miles long, extending through Yorktown, Mt. Pleasant, Greenville and Yonkers, Westchester County. The time allowed to complete the work is 36 months. The work will include several stretches of aqueduct, cut and cover, aggregating 250 ft. The base price on plain structural material and plates, New York, is still 1.71c., the prevailing quotation on steel bars, 1.66c. and bar iron, according to the grade and quantity, from 1.70c. to 1.80c.

Ferroalloys.—Several sales of 50 ton lots of ferromanganese have been made at $44.50, Baltimore. In all, about 300 tons have changed hands in this market during the week. For 50 per cent. ferrosilicon sellers are asking about $62.50, and for delivery over the second half $63.50 is demanded. Makers of furnace ferrosilicon have advanced their prices.

Cast Iron Pipe.—Conditions continue favorable in this branch of trade. Inquiries are steadily coming forward for spring shipment, and public lettings, though not large, are fairly numerous. Prices are well maintained. Carload lots of 6 in. are quoted at $25.50 to $26 per net ton, tidewater.

Old Material.—Shippers are now contending with many annoyances. In ordering forward material due on contracts, they find little available from the railroads, as accumulations are covered with snow, while cars loaded with shop scrap are likely to be sidetracked in favor of higher class freight. The recent heavy snowstorm has thus interfered considerably with the business of the dealers, although operating to some extent in their favor by compelling the mills to use up the stock on hand, so that embargoes in eastern Pennsylvania are being lifted. Some of the steel works outside of the combined purchasing arrangement are now in the market, although no large transactions are reported. Rerolling rails are weak. A better demand is observed for railroad wrought, borings, turnings and wrought pipe. The foundry demand is steady. The following quotations, per gross ton, New York and vicinity, are unchanged from last week:

Rerolling rails	$16.00 to $16.50
Old girder and T rails for melting	15.00 to 15.50
Heavy melting steel scrap	15.00 to 15.50
Relaying rails	20.50 to 21.00
Standard hammered iron car axles	26.00 to 27.00
Old steel car axles	19.50 to 20.00
No. 1 railroad wrought	17.50 to 18.00
Wrought iron track scrap	15.00 to 15.50
No. 1 yard wrought, long	15.00 to 15.50
No. 1 yard wrought, short	14.50 to 15.00
Light iron	9.00 to 9.50
Cast borings	9.00 to 9.50
Wrought turnings	11.50 to 12.00
Wrought pipe	14.00 to 14.50
Old car wheels	15.50 to 16.00
No. 1 heavy cast, broken up	15.00 to 16.00
Stove plate	13.00 to 13.50
Locomotive grate bars	12.50 to 13.00
Malleable cast	16.50 to 17.00

The Geo. E. Molleson Company has been incorporated under the laws of the State of New York for the purpose of buying and selling iron and steel products and railroad supplies. Geo. E. Molleson is president and treasurer and L. M. Shook is secretary. The New York office will be continued at 50 Church street, and the Chicago office will be located in the Railway Exchange Building. Mr. Molleson has been railroad representative for the Tyler Tube & Pipe Company for the past 17 years, and the Geo. E. Molleson Company will continue the representation, Mr. Molleson giving the business his personal attention.

Metal Market.

NEW YORK, January 19, 1910.

THE WEEK'S PRICES.

Cents per Pound.

	Copper.			Lead.		Spelter.	
Jan.	Lake.	Electrolytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.
13	14.12½	13.87½	32.65	4.70	4.65	6.25	6.15
14	14.25	13.87½	32.50	4.70	4.65	6.25	6.15
15	14.25	13.87½	....	4.70	4.65	6.25	6.15
17	14.00	13.75	32.30	4.70	4.60	6.25	6.15
18	14.00	13.75	32.30	4.70	4.60	6.25	6.10
19	14.00	13.75	32.75	4.70	4.60	6.25	6.10

With the possible exception of tin, the metal market is weaker all along the line. Lake copper has been freely offered at 14c., and buyers show no disposition to come into the market. Spelter shows a decidedly weak tendency, and lead is softer. There has been some buying of tin, and that is the only branch of the metal trade in which any real interest is being taken.

Copper.—While plenty of confidence has been expressed as to the future of the copper market, because it is a known fact that the output is being curtailed, the market just now is weak. Lake copper is down to 14c., and plenty of it is being offered at that price. Buyers are scarce, and only small lots are being taken. The principal demand comes from the brass mills. Electrolytic is also weak; some sales have been reported at 13.62½c., although the general market is 13.75c. Considering the fact that no business of any account is being done, it might be said that the market is more weak in tone than in reality as a buying movement might send the price up somewhat. The market in London to-day was firm. Spot copper was sold for £60 12s. 6d., and futures for £61 11s. 3d.

Waterbury Average.—The Waterbury average for December was 13.75c.

Pig Tin.—Pig tin was active yesterday and to-day after a dull week. The storm has tied up traffic so that there is no available spot tin in New York and premiums of 5 to 15 points are being asked for tin for immediate use. It is likely that there will be something of a squeeze in tin before the month is out. The United States Steel Corporation seems to be in possession of most of the tin in sight, and it is said in the trade that the corporation protected itself against speculators' operations within the last three weeks by contracting in the East Indies for about 6000 tons, covering a five months' supply. The information is given for what it is worth. Good prices have obtained during the week, and yesterday there were sales amounting to around 600 tons, about one-quarter of which went to consumers and the rest changed hands among dealers. Consumers as a rule seem to have no faith in the situation, and the speculative interests apparently control matters. In London this morning the market was up £1 2s. 6d. over yesterday, which was caused by a sharp buying movement there, and it is probable that the sales made in this market had their effect. In London to-day spot tin sold for £147 15s., and futures for £149 5s. Sales amounted to 180 tons of spot and 400 tons of futures.

Tin Plate.—There is no change in the tin plate situation beyond the fact that the price of Welsh tin plate may again advance, as it is said that the supply is getting short and the demand is heavy. For domestic tin plate sellers are asking $3.84 for 100-lb. IC coke plates, and it is still very scarce.

Lead.—Lead is somewhat softer, and outside interests are now offering it in New York at 4.72½c., which is 2½c. less than they were asking a week ago. The American Smelting & Refining Company continues to hold the metal at 4.70c. The St. Louis market is weaker, and plenty of the metal can be had there at 4.60c. The demand in the West is very light, and it would not be surprising if prices eased off still lower in that territory.

Spelter.—While manufacturers of spelter continue to control the situation to an extent, there have been sales in this market at 6.25c., and from all accounts plenty of prime Western can be had at that price. There is an unusual scarcity of brass mill special spelter, however, and on some grades sellers are getting from 10 to 15 points higher than the regular market price. Considering that the general market is somewhat ragged, the situation is unusual. It is hard to quote a price for St. Louis, as sales are being made there at anywhere from 6.05c. to 6.15c.; 6.10c. might be considered a fair average price in that market.

Old Metals.—The market is firm but quiet. Following are dealers' selling prices:

	Cents.
Copper, heavy cut and crucible	13.25 to 13.50
Copper, heavy and wire	12.75 to 13.00
Copper, light and bottoms	11.75 to 12.00
Brass, heavy	9.50 to 9.75
Brass, light	7.75 to 8.00
Heavy machine composition	12.25 to 12.50
Clean brass turnings	8.75 to 9.00
Composition turnings	10.25 to 10.50
Lead, heavy	4.40 to 4.50
Lead, tea	4.05 to 4.15
Zinc scrap	5.00 to 5.25

Antimony.—Antimony is weak, contrary to the anticipation of many people in the trade who had expected that by this time higher prices would prevail. Cookson's can be had at 8.50c., and Hallett's is selling at 8.25c. Outside brands are 8c. The quotations on antimony to arrive have weakened, and they are now very close to the spot price.

Iron and Industrial Stocks.

NEW YORK, January 19, 1910.

Much liquidation of stocks has occurred since our last report, the outpouring of United States Steel common having been notably heavy on some days, far exceeding transactions in any other stock. It is claimed that speculative pyramids have been toppled over, carrying with them sales by timid holders or by those who hastened to retain a portion of their paper profits. The liquidation was partly due to heavy losses by speculators operating on the Cotton Exchange, who at the same time were interested in stocks, and was probably also induced by what have been considered as unfavorable developments at Washington. Good general business reports were ignored. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..	13½ - 14¼	Railway Spr., com.	46 - 49½
Allis-Chalm., pref..	50 - 52	Railway Spr., pref.	106½-107
Beth. Steel, com..	31 - 33	Republic, com.....	40 - 43¾
Can, com.....	12⅝- 13½	Republic, pref.....	100 -103¼
Can, pref.....	78¾- 80⅝	Sloss, com.....	80½- 85
Car & Fdry, com..	65¼- 69½	Sloss, pref.....	118
Car & Fdry, pref..	116½-119½	Pipe, com.....	28⅝- 31
Steel Foundries...	64 - 65	Pipe, pref.....	82 - 83½
Colorado Fuel.....	43⅛- 46½	U. S. Steel, com...	83¼- 87½
General Electric...	153¼-157¼	U. S. Steel, pref...	122¼-125
Gr. N. ore cert...	73 - 78⅝	Westinghouse Elec.	69¾- 78¼
Int. Harv., com...	119 -123½	Va. I., C. & C....	69 - 70
Int. Harv., pref...	125⅞-127¾	Am. Ship, com....	77 - 78⅛
Int. Pump, com...	50 - 53⅝	Chi. Pneu. Tool...	39½- 43
Int. Pump, pref...	89 - 90¾	Cambria Steel.....	49¼- 52⅝
Locomotive, com..	55½- 58⅞	Lake Sup. Corp...	26¼- 26¾
Locomotive, pref..	113¼-114	Warwick	11⅛- 11½
Nat. En. & St.,com.	23⅝- 25¼	Crucible St., com..	15⅝- 17
Nat. En. & St., pref....	96½	Crucible St., pref..	88½- 91½
Pressed St., com..	45¼- 48¼	Hrb.-W. Ref., com.	34 - 35
Pressed St., pref..	104 -104½		

Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 82⅞, preferred 122, bonds 104½; Car & Foundry common 65, preferred 117; Locomotive common 53¾, preferred 113½; Colorado Fuel 43¾; Pressed Steel common 45⅞, preferred 103; Railway Spring common 46; Republic common 38½, preferred 100⅜; Sloss-Sheffield common 80; Cast Iron Pipe common 29½, preferred 82; Can common 12, preferred 78½.

A special meeting of stockholders of the Standard Underground Cable Company, Pittsburgh, has been called for March 10, to vote on a proposed increase in the capital stock of the company of $750,000, with a view later on, it is stated, to paying a stock dividend of 25 per cent. The authorized stock is $3,000,000, of which $2,800,000 is outstanding.

The Board of Directors of the Allegheny Steel Company, Pittsburgh, Pa., has called a meeting of its stockholders to be held January 25, for the purpose of voting on a proposed increase of the indebtedness of the company from $300,000 to $450,000.

The directors of the International Harvester Company have recommended to the stockholders that the common stock of the company be increased $20,000,000 and the new stock distributed ratably as a stock dividend to the present holders of the $60,000,000 of common stock. This bonus represents surplus invested in the business during the last seven years. It was also recommended that $3,200,000 be set aside out of last year's earnings as a 4 per cent. dividend on the $80,000,000 of common stock, payable 1 per cent. quarterly, beginning with April 15. Formal action on the foregoing will be taken at the board's regular dividend meeting January 29.

Dividends.—The Torrington Company has declared the usual semiannual dividend of 4 per cent. on the common stock, payable February 1.

The Allegheny Valley Malleable Iron Company has moved its offices from 361 Frick Building Annex, Pittsburgh, to its plant at Parnassus, near New Kensington, Pa., on the Allegheny Valley branch of the Pennsylvania Railroad.

The Machinery Trade.

NEW YORK, January 19, 1910.

The machinery trade is especially good. A list of the Baltimore & Ohio Railroad, given in the Philadelphia report, has added to inquiries to such an extent that many in the trade think that the business done this January will equal the corresponding month of 1906, which was a record breaker in some machinery lines. With the exception of the large railroad lists there are no big inquiries in the market, but the demand from the general manufacturing field is particularly large and the indications are that most manufacturers are confident of a big year.

Machinery manufacturers who do not own their own foundries are in many cases trying to make arrangements with jobbers in iron and steel machinery castings covering a year's supply. The founders, however, are somewhat chary about making any such arrangements and many of them refuse to book orders beyond two months ahead. They state that there is considerable uncertainty as to the future price of raw material and they are not sure as to future labor conditions. This condition is directly opposite to that which prevailed early in 1909, when founders were anxious to make yearly contracts. At that time machinery dealers had but little business in sight and so were unwilling to place orders very far ahead of time.

The price of leather belting has been advanced 10 per cent. by most manufacturers. With some of the manufacturers this advance went into effect eight weeks ago while others have been gradually raising their prices. It is claimed that the advance is due to the increasing price of hides. This is the second 10 per cent. advance that has been made in the price of leather belting within a year. Prices on some grades of canvas belting have also been put up slightly. Increase in the cost of production caused by advances in the price of machinery and high wages paid for labor is given as the cause.

P. O. Keilholtz, consulting engineer, Continental Building, Baltimore, Md., has been commissioned by the Winchester & Washington City Railway Company to prepare plans and supervise the construction of a power plant to be built at Millville, Va. The plant will cost in the neighborhood of $100,000 and there will be required 1200 turbo direct connected to 1500 kva. turbo generator with exciter and extended shaft. Two 750 hp. boilers with stokers set singly will be used and condensers, boiler feed pumps, a filter plant, &c., will be required. Electric power will be served from the plant to Martinsburg, which is 30 miles distant.

The Carolina, Tennessee Power Company, 115 Broadway, New York, is planning to develop 90,000 hp. from a hydroelectric plant on the Hiawasse River, near Apalachia, Tenn. It is estimated that the plant will cost $8,000,000 and two dams, each 150 ft. high, will be constructed. The power development is within 55 miles of Chattanooga, and about 75 miles from Knoxville, and power will be sold to manufacturers near those cities. The plans have not been completed as yet and it may be a year before any purchasing is done.

W. Ames & Co., 312 Washington street, Jersey City, N. J., are placing orders for equipment for a new plant they are having constructed at Communipaw avenue, for the manufacture of spikes and bolts. It is understood that the power equipment has all been arranged for, but a general line of other manufacturing equipment will be installed. The plant will consist of a spike and bolt shop, 65 x 280 ft.; mill building, 50 x 210 ft.; storage building, 50 x 150 ft.; machine shop, 50 x 150 ft., and an office building, 30 x 40 ft.

Some New Machinery Requirements.

The International Boiler Works Company of East Stroudsburg, Pa., has secured a controlling interest in the Sharp-Arrow Automobile Company, of Trenton, N. J. The patent rights to the car, which were held by Mr. Sharp, the inventor of the machine, have been transferred to a new company which has applied for a charter under the Pennsylvania laws. The company is building a factory, 60 x 150 ft. in size, and will commence manufacturing cars as soon as possible. As yet the machinery equipment has not been purchased, but a list is now being made up.

The Oriental Metal Bed Company of Eighth and Clinton streets, Hoboken, N. J., whose plant was badly damaged by fire January 10, is getting machinery equipment in this territory with a view to re-equipping its plant as soon as possible. It is understood that the general machine shop was not very badly dameged, but from all accounts considerable machinery is required to replace equipment that was damaged.

F. M. & T. K. Glenn, Liberty, S. C., have purchased the right to manufacture in Texas the products now made by John T. Burriss & Sons of Anderson, S. C. The new firm has not decided as yet where its new plant will be located, but it is stated that it will manufacture principally metal shingles. The company will need presses and dies, shears, cornice brakes, &c. Arrangements will be made if possible to purchase electric power so no engines or boilers will be needed.

The Rome Scale & Mfg. Company, Rome, Ga., which recently increased its capital stock to $50,000, is arranging to build a foundry 50 x 50 ft. in size to make castings used in the construction of wagon and platform scales, trucks, &c. It is hoped to have the foundry in operation within the next two months.

The Gulf, Colorado & Santa Fe Railroad has included in its 1910 budget an item of $250,000 for the construction of a roundhouse, machine shop and turntable at Galveston, Texas. The expenditure has been approved by the chief engineer of the company, but as yet it has not been authorized.

Sealed proposals will be received at the office of the Sewerage Commission of the city of Baltimore, Md., February 9, for the construction and equipment of a power house, pump house, conduits, lateral sewers, &c., to be installed in connection with the city sewerage system. Details as to the equipment required can be obtained from Harry W. Rogers, secretary of the Baltimore Sewerage Commission.

The Standard Gas & Electric Power Company, Lancaster avenue, Philadelphia, Pa., has inquiries in this market for equipment to manufacture an automobile gas engine. The company also proposes to manufacture a small automobile and is asking for a general line of machinery covering this branch of manufacture.

The Hammers Steam Plow Company of which G. W. Hammers of Colorado Springs is president, is preparing plans for a plow factory to be built in the vicinity of Colorado Springs at a cost of $50,000. The exact location has not been decided upon as yet nor has the equipment been arranged for.

The Standard Exploration Company, New York City, is reported to have decided upon rebuilding a large smelter which recently came under its control.

No additional generating units are required for the extension of the Franklin Automobile Company's works at Syracuse, N. Y., but motors will be needed for driving the machinery.

Construction of a pumping station for water supply is under consideration by the authorities at Shortsville, N. Y.

A steam turbine power plant will be among the requirements of the Great Southern Lumber Company, Buffalo, N. Y., if plans for a duplication of its Bogalusa, La., mills are adopted. No definite decision, however, is likely to be reached before spring.

A steel frame factory, with corrugated iron sides, and having power, crushing, pulverizing and screening equipment, will be built by the Atlas Paint Company at Nashville, Tenn.

A. Wyckoff & Son Company, Elmira, N. Y., have had plans prepared for a factory to be built at some point in the South. Large wooden pipe banded with steel rings will be the product. Motor drive is to be used.

The Spence, Smith & Kootz Company, recently organized at Parkersburg, W. Va., will operate a machine shop there. The equipment required at present is already provided for.

From Bessemer, Ala., it is reported that the Veitch-Matthews Engine Company will build a foundry and machine shops there.

A new factory, with cutting, finishing and power equipment, is to be completed by the Rome, Ga., Cooperage Company in the near future.

A compressor outfit for construction purposes will be provided by the Mackle-Crawford Company, Jacksonville, Fla., to be used in erecting steel frames.

The Yawman & Erbe Mfg. Company, Rochester, N. Y., will add to its electrical equipment.

Construction of a pumping plant and water works system will begin this winter at Florence, S. C.

A power and compressor plant, tipple, larries, electric motors, &c., will be provided shortly by the Rochester & Pittsburg Coal & Iron Company, for handling the output of the mines at Lucerne, Pa.

The Piedmont Buggy Company, Charlotte, N. C., is carrying into effect plans for a new plant, 65 x 225 ft., three stories, the machinery in which will be motor driven.

Machinery will be required shortly for the new pumping station and electric power plant to be built by the city of Kimball, W. Va. Ground for the buildings has already been broken.

C. W. Stallworth, Cuba, Ala., is understood to be in the market for power and cutting machinery to be used in a new mill.

An engine of about 250 hp. or larger will be bought in the near future by the Carrollton, Ga., Electric Company.

An electric generating set is to be bought in the near future by the Sussex Light & Power Company, Salisbury, Md.

Plans have been put in execution by the Hudson Chair Company for a factory at Hudson, N. C.

It is reported from Houston, Texas, that the Grant Iron

Works will require considerable new machinery for an extension of its shops.

The Rochester Drop Forge Company, Rochester, N. Y., has been incorporated with a capital stock of $40,000. This company succeeds the Rochester Pipe Tongs Company, which has been in business over 30 years manufacturing chain and pipe tongs, machine handles and special forgings. The new company will continue the manufacture of this line of specialties, as well as forgings, of a superior grade, of automobile parts. It has moved from the old quarters into a new plant which is equipped with modern machinery. The officers are: L. M. Beattie, president and treasurer; L. W. Hostettler, vice-president, and F. K. Thompson, secretary.

The Utica Drop Forge & Tool Company, Utica, N. Y., has arranged with John H. Graham & Co., 113 Chambers street, New York, to represent it in the Metropolitan District. A stock of Utica pliers will be carried by the new agents.

The Jamestown Metal Furniture Company, Jamestown, N. Y., will increase its capital stock from $300,000 to $600,000, for the purpose of enlarging its plant. Details of the new buildings and equipment to be provided will soon be decided upon.

Chicago Machinery Market.

CHICAGO, ILL., January 18, 1910.

The automobile manufacturers have begun placing orders for milling machines to be used in the manufacture of their product for 1911. This interesting development of the trade has grown out of the fact that the leading manufacturers of milling machines have booked their capacity for various dates running from June to December of this year, depending on the size and style of machine, and in the near future their entire product for the current year may be sold. Last year one automobile concern bought 100 milling machines, and while it is not expected that business with the automobile manufacturers will attain such proportions during the present year as last year, the leading manufacturers in that trade seem to have unlimited confidence in the future, and their output for this year has been limited only by their ability to get materials.

The general demand for machine tools is very satisfactory. A good volume of inquiries has come in already this month, and the business done sustains the belief of machinery men that they have a prosperous year before them. There is trouble in getting shipments through on account of congested freight traffic, but this is only a temporary condition due to the severe weather. The gasoline engine manufacturers are very steady buyers of machine tools, showing a healthy growth in their business. The local machine shops throughout the West furnish a large quota of the trade, and manufacturers in all lines are increasing their equipment.

One Chicago house recently sold a large boring mill for a novel purpose, to finish flywheels for gasoline engines. The hub is bored and the face and edge of the rim are turned at one operation, taking about 25 min. on a 42-in. flywheel.

The E. L. Essley Machinery Company, Chicago, has recently obtained two exclusive agencies, in addition to its large line of machine tools. One is from the Toledo Electric Welding Company, Toledo, Ohio, electric welders, and the other agency is for planers made by the Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass.

The W. M. Ryan Company, 314 South Canal street, Chicago, has perfected a new type of gasoline engine in which there is a power stroke at each revolution. During the working stroke of the piston air is compressed in the crank case, and when the exhaust opens this air scavanges the cylinder and provides the mixture to be compressed on the return stroke. The engine develops a high speed and a high power rating for its size, and seems to work as well with kerosene as with gasoline or even better, although gasoline is necessary for priming. The inventor is Edward G. Shortt, who invented the Westinghouse triple air brake valve. W. M. Ryan, president of the Ryan Car Company, Chicago, is the president and backer of the W. M. Ryan Company, which has been carrying on experimental work for three years on this engine. The company intends to provide a larger plant in the near future for the manufacture of engines of this type.

The W. A. Jones Foundry & Machine Company, Chicago, has purchased the plant of the Superior Machine Works and will continue it in operation for the manufacture of woodworking machines.

The Highland Power Company, Boulder, Colo., has been incorporated and capitalized at $3,000,000. The company owns the Highland Mary reservoir located about seven miles from the Continental Divide on Boulder Creek, Boulder, Colo.; also a pipe line right of way and mill site for power station, about 2438 ft. from reservoir, in which distance a fall of over 600 ft. is obtained. The company will erect a plant of sufficient capacity to develop 6000 hp., at a cost of about $1,250,000. Most of the power generated will be utilized in mining in Boulder, Gilfin, Clear Creek and neighboring counties of Colorado. The location of the proposed plant is about 22 miles from Boulder. The incorporators of the company are I. N. Bair, H. O. Andrew and H. W. Brougher.

W. H. Bryant, who formerly conducted a scrap brokerage business in the Commercial National Bank Building, Chicago, has combined his business with that of the Rolfe Iron Company, which company has been operating a scrap plant at Clybourn place and the river. The company has taken in about $16,000 additional capital and will equip its yard with the most modern appliances for cutting and handling scrap. It is also the intention of the company to make a specialty of the higher grades of melting stock. The company will be in the market in the immediate future for scrap pipe cutting machines.

French & Hecht, successors to the Bettendorf Metal Wheel Company, Davenport, Iowa, will build either a two or three story foundry building, which will be equipped with various mechanical appliances for handling sand, castings, &c.

The St. Louis Basket & Box Company, St. Louis, Mo., is erecting a new factory building 50 x 127 ft., four stories, which will be equipped with sprinkler system, glue spreaders, sanding machines, hydraulic presses, &c., none of which has been purchased. It is expected that the building will be ready for occupancy about April 1.

The Direct Drive Mfg. Company, Indianapolis, Ind., incorporated and capitalized at $50,000, will engage in the manufacture of transmission for automobiles. The officers of the company are Wm. H. Parkinson, president; Wallace M. Parkinson, vice-president; Arthur C. Downing, secretary and treasurer, and B. F. Meixell, manager.

The Chalmers-Detroit Motor Company, Detroit, Mich., has added another five and a half acres to its factory site and contemplates extensive building within the next few months. The company has just completed a four-story building which gives it a total floor space of 500,000 sq. ft. The nature of the work to be handled in the new addition has not been definitely decided as yet.

The Hamilton Light & Water Company, Hamilton, Mont., is preparing plans for the construction of a hydroelectric plant to be located on Sleeping Child Creek, about six miles from Hamilton. The estimated cost of the plant is about $150,000.

The Retherford Brothers Company, Muncie, Ind., manufacturer of gas and electric fixtures, will increase the capacity of its plant in the early spring by the erection of a new factory building 80 x 250 ft., one story, to be of brick and iron construction with concrete floors.

The Hastings Cabinet Company, Hastings, Mich., has increased its capital stock from $30,000 to $60,000 and will double the working capacity of its plant.

The Chicago Hardware Foundry Company, North Chicago, Ill., has recently completed the erection of a new foundry building, a sawtooth roofed building for a tin shop and warehouse. The company advises that it contemplates the doubling of its brass foundry capacity with further additions to machine shop and possibly a new office building.

Philadelphia Machinery Market.

PHILADELPHIA, PA., January 18, 1910.

Interest in the local machinery market has been stimulated by inquiries for tool equipments from several of the railroads in this vicinity. The most important list of railroad requirements that has been before the local trade for some time is that of the Baltimore & Ohio Railroad, which covers an estimated expenditure of something like $100,000; included in the list there are seven planers, 34 lathes, 14 grinders, six punches and shears, boring machines, driving wheel lathes, axle lathes and a number of other tools. Information as to the distribution of the respective tools is not yet available. The Pennsylvania Railroad also has inquiries out for several small lots of tools, one being for six radial drills. In instances lists have been prepared by master mechanics for general shop equipment, but as yet purchases have not been authorized. The trade is much encouraged by the fresh railroad business, which has been hanging back for a long time, and it is now believed that more general buying will develop in that field during the present year.

Sales during the week have been of an unimportant character, the bulk of the transactions being of a relatively small size individually. Several small lots have been disposed of by merchants to automobile repair shops; builders of automobiles also have been taking a few tools. The demand in general, however, has not yet opened up since the first of the year. Manufacturers of both standard and special lines have been taking a fair run of orders, and plants are being run on a fairly active basis. Deliveries on certain classes of tools are somewhat delayed, merchants particu-

larly complaining that the extended delivery dates, especially on milling machines, are seriously handicapping them in closing up business under negotiation and frequently result in the loss of an order.

There has been no further development in the foreign demand; little new business comes out, and such as has been received by the trade in this district is largely of a special character.

The movement in second-hand tools and machinery has not been very heavy. Some little business develops from day to day, but the market is irregular and has a tendency toward quietness. Practically the same conditions are to be noted in the demand for second-hand boilers and engines, although a somewhat better demand for new equipment of the latter class is reported.

The foundry trade shows a little betterment, steel casting plants particularly are now pretty fully engaged and deliveries are hardening. The demand for gray iron machinery castings is a trifle better; deliveries, however, can still be had fairly prompt. General jobbing foundries are moderately active, considering the season of the year.

The Automobile Show, which is being held in the Third Regiment Armory this week, is claiming more or less attention of the trade, particularly makers and agents of automobile accessories.

The Pennsylvania Flexible Metallic Tubing Company, Seventy-second street and Powers lane, has purchased the factory building, together with adjacent ground, which it has been occupying at the above location for nearly a year. No further improvements to the plant are contemplated at the time.

The Tropenas Steel Company, New Castle, Del., reports the prospects for 1910 as very bright, and with this in view is building baby tropenas converters to carry in stock so as to supply demands without unusual delay. Business has increased steadily in the casting department, and the company may increase its foundry during the coming year.

It is reported that the Taxicab Service Company, Baltimore, Md., has acquired property at 211 Park avenue, in that city, which will be improved and equipped for passenger and merchandise taxicab service.

The Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa., is increasing its facilities by the installation of an outside crane runway, 40 ft. span and 200 ft. long, to be used in a storage yard for flasks and castings pending shipment. Business with this concern has about reached normal proportions.

The Southwark Foundry & Machine Company averaged about 75 per cent. of normal productive capacity during the past year, the first half being dull; the average was increased, however, by a decidedly better volume of business during the second six months. The plant is now operating at normal capacity, with a considerable volume of business ahead, the present demand not being especially confined to any one line, but averaging the general run of the company's products.

The Wm. J. McCahan Sugar Refining Company has purchased several tracts of land adjoining its refinery on Tasker and Swanson streets, fronting on the Delaware River. The property acquired has a frontage of 665 ft. on Tasker street. We are advised that it is not the intention of the company to immediately improve the property, although an addition to its refinery may be built on the site in the future.

New England Machinery Market.

BOSTON, MASS., January 18, 1910.

Interest is beginning to center more closely on deliveries. Dealers are losing some orders because of their inability to guarantee prompt shipments. The general anticipation is that an even more rapid recession of promised dates will soon take place, because of the exhausting of finished stocks. Many of the shops are no longer able to produce in a volume equal to the demands made upon them. A radical change has come over the market in a few weeks regarding the heavier classes of machinery. In addition to those types which have been scarce for several months planers are no longer easily obtainable for quick delivery, in spite of the fact that the builders still have some completed parts on hand, even including beds over which a chip has been taken and which have been laid away to season. The demand for radials, especially the larger sizes, has increased to such an extent that they, too, have joined the list of late deliveries. The boring machines are in much the same category. The tendency to increase prices has not changed, and further announcements of increases in the lists have been received from the manufacturers. No great increase in the volume of business in New England is reported, but the dealers are all enjoying a snug, profitable trade.

The machinery steel dealers are almost uncomfortably busy; orders, already satisfactory in volume, have increased largely.

The American Tube Bending Company, Inc., has been organized at New Haven, Conn., to make a specialty of the manufacture of manifolds for the automobile gas engine. It is a Connecticut corporation with $10,000 cash capital. The incorporators are H. S. Munson, J. H. Bradnack and G. C. Munson, all of New Haven. The factory is located at Lawrence and Mechanic streets.

The Whitin Machine Works, Whitinsville, Mass., manufacturer of textile machinery, is planning a 100-ft. extension of its new foundry, which will make it 300 x 500 ft. The new blacksmith shop will be increased by an addition, 87 x 100 ft.

The Holyoke Motor Foundry Company, Holyoke, Mass., will erect a new foundry, 80 x 88 ft., of steel and concrete.

The latest Connecticut street railway project is that of the Norwich, Colchester & Hartford Traction Company, which would connect the two important centers included in the name. The directors at a meeting in Norwich have voted to issue $400,000 of preferred stock and to begin construction in the spring.

The Winchendon Electric Light & Power Company, Winchendon, Mass., is contemplating increasing its power, probably through a new hydraulic station.

Hill, Clarke & Co., Boston and Chicago, have been given the agency for the Lester three spindle automatic screw machine built by the Davis Sewing Machine Company, Dayton, Ohio.

The Taylor Machinery Company, Boston, dealer in machine tools, has occupied its new store at 42 Oliver street, moving from the Oliver Building.

The Rutland Railway, Light & Power Company, Rutland, Vt., has acquired the properties of the Fairhaven Light & Power Company, Fairhaven, Vt., including the Carver's Falls power installation, and the transmission lines to Fairhaven and Poultney, Vt., and Whitehall, Vt. It is stated that the consolidation will simplify the construction of a new traction line from Castleton to Poultney, a distance of six miles, and the furnishing of power to a large number of quarries. The statement is made that the company plans to enlarge its power facilities.

The contract has been let for the repairs to the factory of the T. C. Richards Hardware Company, Winsted, Conn., which was seriously damaged by fire recently.

Building operations in industries outside of metal lines include the following: Irving D. Andrews, Littleton, N. H., large box shop at Portland, Maine, to be equipped with 300-hp. engine and modern woodworking machinery; Springfield Glazed Paper Company, West Springfield, Mass., addition to factory, 60 x 65 ft., two stories and basement; Kellogg & Bulkeley Company, Springfield, Mass., lithographers, one-story factory building, designed for additional hight when the need shall arise; Kupfer Bros., New York, have acquired the property of the Riverdale Woolen Company, Whitinsville, Mass., and will occupy it for paper manufacturing; Whitney Valentine Company, Worcester, Mass., valentine manufacturers, will have to replace entire plant which was burned January 12, with loss of $300,000, including all machinery; Niantic Menhaden Oil & Guano Company, South Lyme, Conn., will erect a new plant to replace that recently burned, with main building, 130 x 200 ft., of concrete; Hamilton Woolen Company, Southbridge, Mass., will add to its weave shed and build a large power station.

M. J. Gibbud, New Haven, Conn., building contractor, proposes to erect a woodworking plant, 45 x 100 ft., which will be equipped with an engine and boiler and some woodworking machinery.

The plant of the Nichols & Langworthy Machine Company, Hope Valley, R. I., has been sold by the trustee to the Washington Trust Company, Westerly, R. I. No plans have been announced for continuing the business, nor is hope expressed that the plant will resume manufacturing.

The Osgood Bradley & Sons Company, Worcester, Mass., has decided not to establish a power plant at the new car works now under process of construction, but will buy its power of the Connecticut River Transmission Company. The contract calls for an average of 700 kw. a day for five years, with a maximum of 900 kw.

The Boston Elevated Railway Company has lost by fire one of its power stations, that on Harrison avenue, used as an auxiliary and called into service only when traffic was heaviest. The Central Power Station near by was saved with difficulty. While the burned unit was not a great one, the absence of its generating equipment will be felt seriously, and may have the effect of hastening the creation of a large station, which will be established on the site recently purchased at City Point, South Boston.

An announcement of much significance in the shoe machinery business is that of Thomas G. Plant, that he is installing in his shoe factory at Boston a complete shoe manufacturing equipment built by the independent shops of New England, rendering him independent of the United Shoe Machinery Company. The machinery trade has followed the independent shops for years, and in a few cases have found them good customers. It has always been held that when a complete equipment should become available to the shoe manufacturing industry there would be rapid develop-

ment of the independent shops, which would make them large buyers. Up to the present time the United Shoe Machinery Company has practically controlled the shoe machinery business. It is doubtful, however, if the independent companies will in the aggregate equal the purchasing power of the great shops at Beverly, Mass., for some years.

The Standard Foundry Company, Hartford, Conn., manufacturer of gray iron castings, has acquired a tract of land in that city upon which a new plant will be built.

The control of the Confectioners Machinery & Mfg. Company, Springfield, Mass., manufacturer of confectioners' machinery, has been acquired by a new corporation known as the National Equipment Company, which in turn is controlled by leading confectionery manufacturers of the country. The business is said to be the largest of its kind in the world. The new corporation has a capital stock of $700,000.

A dispatch from Pittsfield, Mass., states that the General Electric Company is to devote $600,000 to improvements to its works in that city, which is more than was ever expended in any one year of the company's history. The initial building of the schedule is a large pattern storage structure.

The Worcester Consolidated Street Railway Company, Worcester, Mass., is planning to establish a large power station. Engineers are making preliminary surveys, with the purpose of deciding the location of the plant, but nothing definite has been determined; neither have details of the size of the new unit been settled, but probably 40,000 hp. is not far from the figure. At the present time the company uses some 10,000 kw. This is entirely inadequate during the busy hours of the day, and the new station will also take care of the future needs of the system, including the trolley express lines. The new unit will probably be nearly four times the present available power.

The Norton Grinding Company, Worcester, Mass., manufacturer of grinding machines, has increased its capital stock from $10,000 to $408,000, but the transaction is merely a formal one, carrying with it no increase in resources, nor plans of enlargement. As will be noted the former capitalization was merely nominal. The new figure is covered by present resources.

The Champlin & Norton Mfg. Company, Plainville, Conn., will soon be in the market for presses and the other tools of a complete equipment for the manufacture of electrical specialties, among them a new switch and cut-off cut-out. It is a new Connecticut corporation, with authorized capital stock of $10,000. F. A. Champlin is the president; J. L. Burton, vice-president; Minton A. Norton, secretary, and Harvey Williams, treasurer. Mr. Champlin is a resident of Longmeadow, Mass., and the others live in Plainville. Mr. Norton is a foreman with the Stanley Works, New Britain, Conn. The location of the factory is not decided upon.

The United Waltile Company, Ltd., has taken a factory at 151-157 High street, Waltham, Mass., where it will manufacture a flexible enameled metal tiling. F. Sears Stetson is president, and F. C. Stetson, treasurer.

The National Sales Company, Inc., New Haven, Conn., will erect a factory building at Mt. Carmel, Conn., 40 x 97 ft., one story, which will be used for manufacturing metal goods under patents held by the company, and also as a printing plant. The company has recently been organized with $50,000 capital stock, as manufacturers, wholesalers, importers and dealers in regular and specialty lines. P. C. Butterfield is president; R. K. Dean, vice-president, and R. L. Carter, secretary and treasurer.

The Weir Stove Company, Taunton, Mass., is erecting a small auxiliary foundry for use when the main foundry is not running.

The new building of the American Locomotive Company, Providence, R. I., will be 70 x 190 ft., three stories, and will be used for storeroom purposes in connection with the automobile factory.

George W. Moore, 15 Chardon street, Boston, is making a specialty of duplicate parts for the trade, manufactured on automatic screw machines, and is making prompt deliveries on sizes up to ⅜ in. diameter. Mr. Moore has been established in business for 30 years.

Cleveland Machinery Market.

CLEVELAND, OHIO, January 18, 1910.

Machine tool houses generally report business quiet. The market has shown little life since the holidays, which is surprising to some of the dealers, who were looking for a good demand early in the month. A little more activity, however, has been apparent during the past day or two, and it is believed that the volume of business will be about normal by the end of the month. No good sized inquiries have come out recently, the present demand being for single tools. Very little business is coming at present from the automobile trade. Many manufacturers in metal working lines are planning plant extensions, but in most cases this work will not be started until along in the spring, and orders for machinery for these extensions are not yet being placed. The demand for machinery for forging plants continues quite active. With the approach of spring dealers look for a good volume of business in small orders for equipment for garages.

Local machine tool builders are still crowded with old orders so that the falling off in the volume of business during the past two or three weeks has enabled some of them to get in a little better shape on deliveries.

The Taplin-Rice-Clerkin Company, Akron, Ohio, manufacturer of stoves, ranges and hot air furnaces, expects to erect a new plant, largely increasing its present capacity during the present year. The company has not yet prepared plans, but an expenditure of $50,000 for new buildings is contemplated. At the annual meeting last week the old officers were re-elected as follows: President and general manager, William Clerkin; vice-president, C. B. Raymond; secretary, J. H. Miller; treasurer, E. L. Crow.

Sealed proposals will be received by the Board of Managers of the Ohio Penitentiary, Columbus, Ohio, February 11, for equipment for a new power plant, including two direct-connected exciter units, consisting of 75-hp. simple horizontal automatic high speed engines, and 50-kw., 125 volt direct current generators. Plans and specifications are on file at the office of the warden of the penitentiary and at the offices of the Osborn Engineering Company, Cleveland, and Marriott & Allen, Columbus.

The Adamson Machine Company, Akron, Ohio, reports that the past year was the most prosperous in its history, and with the increased facilities of its new plant, into which it is now moving, it expects its 1910 business will be double that of the past year. At the annual meeting recently held the following officers were elected: President, Alexander Adamson; vice-president, W. E. Slabaugh; secretary, R. B. Koontz; treasurer, C. J. Gilletly.

The Shull Steel Castings & Mfg. Company, Canton, Ohio, has just completed an addition to its plant, extending its building 100 ft., and has installed a new 25-ton furnace. The company reports that it has enough orders on hand to keep it busy for several months. At the recent annual meeting the following officers were elected: President, Willard Pennock; vice-president, John Hahn; secretary, Frank Wise; treasurer, Leonard Shull; general manager, E. G. Van Horn.

The Winfield Electric Welding Machine Company, Warren, Ohio, has been incorporated with a capital of $9000 by W. C. Winfield, R. A. Cobb, G. W. Bayard, J. H. Ewalt and R. C. Taylor. Some time ago W. C. Winfield perfected an electric welding machine which was placed in use by the Winfield Mfg. Company in its electric welding department.

The County Building Commission of Cuyahoga County, Cleveland, which has had under consideration for some time the erection of a power house, has decided to go ahead with plans for a $250,000 plant to furnish power, heat and light for the new courthouse, which is nearing completion.

The Ideal Electric Mfg. Company, Mansfield, Ohio, is increasing the capacity of its plant by the installation of considerable additional machinery. At the recent annual meeting the following officers were elected: President and treasurer, C. H. Voegele; vice-president, William Dow; secretary and general manager, S. Glen Vinson.

The McLean Arms & Ordnance Company, which has operated a plant in Cleveland some time for the development of a new rapid fire gun, has completed its development work and is offering its equipment, including about 35 machine tools of late pattern, for sale. It is understood that the company is negotiating for the adoption of its gun by some country and until some such negotiations are concluded steps will not be taken towards the establishment of a plant for the manufacture of the new ordnance.

The Reliable Machine Company, Cleveland, which was recently incorporated, has established a plant at 224 High avenue for general machine shop work.

Milwaukee Machinery Market.

MILWAUKEE, WIS., January 18, 1910.

The promise shown by the first two weeks of the year has been well sustained, and the volume of business offering is generally satisfactory. Current orders for machine shop and foundry equipment are working more and more into the smaller specialties, contracts covering large standard tools, cranes and heavy apparatus used in the production of castings, having in most cases been made so far ahead as to practically preclude present bookings, at least for reasonably early delivery. During the next few months, however, completion of foundry and shop additions now under way will gradually increase the working capacity of machine manufacturers in this State to a point very largely in excess of last year, and some who have been refusing orders of late will again be looking for business. A few concerns, by means of temporary shifts and the use of leased facilities,

have managed to anticipate this increased capacity, and they may be compelled to continue such a course even after the latter has been provided. Plants which stood idle for years are again being occupied.

The labor situation has improved materially, more skilled machinists having been attracted here by the excellent working conditions offered them. The growing use of the highest grade, high speed tools, and substitution for older types of automatic or semiautomatic machines capable of being worked in groups by one man and helper, sometimes only laborers, is also exerting an appreciable effect upon the aggregate of each shop's production. Wisconsin manufacturers are devoting much more careful consideration to the subject of works economy than at any previous period, and there cannot fail to be throughout the present year an excellent demand for labor or time saving appliances of every description. Such auxiliary electrical contrivances as lifting magnets, magnetic separators, motor driven compressors that can be brought directly to the work, automatic cutout devices, &c., are also receiving considerable attention. In respect to many of these, however, there is a dearth of reliable information, as most manufacturers appear to have let their printed matter become largely exhausted during the period of business stagnation, and the new catalogues on which practically all have been working recently are slow in coming out.

Equipment for industrial plants of all kinds continues in urgent demand, and it is a noteworthy fact that in the interior of the State, as well as up North, a considerable percentage of it is being turned out by relatively unimportant shops situated in the vicinity of the new mill or factory. Of course, this condition applies only to the less complicated machinery, as well as plate and tank work, but it is significant of the prevailing desire to expedite the completion of such plants, so as to take advantage of the high prices ruling for commodities. Were the owners of the new plants to rely entirely upon the customary source of equipment supply, they would have to accept some deferred deliveries, but by piecing out with home work they are making record time in construction.

The demand for hydro-electric machinery, which was very vigorous early in the fall and later diminished to quite an extent after the closing of some large contracts requiring 12 to 18 months for their execution, has again revived; but this time it takes the form mainly of inquiries for turbines and dynamos of small or medium sizes. In Wisconsin a number of low-head propositions of 500 to 1500 hp. are about to be developed, and a multitude of small units will be put to work in streams in every section of the State. Among others, municipalities are awakening to the possibilities of this source of power for lighting plants. The Leffel type of wheel seems to be particularly suited to the smaller and medium size developments, while Allis-Chalmers and McCormick turbines are mentioned most in connection with large plants.

An important development in Wisconsin industries, of which more will be said later, is the incorporation for $10,000,000 of the Mitchell-Lewis Motor Company, Racine. One of the largest automobile plants in the country will be established.

The Milwaukee-Western Electric Railway, with offices in the Majestic Building, Milwaukee, is about to let contracts for the construction of the new 2000 hp. steam electric plant at Hustisford, Wis., mentioned in *The Iron Age* some weeks ago, and machinery will also be purchased in the near future. Inquiries may be addressed to the company's engineer, W. D. Chapman, Marquette Building, Chicago.

The plant of the Gehrlinger Steel Casting Company, West Allis, Wis., will be still further enlarged in the spring, and a new furnace may be needed.

A gas producer plant of 75 to 100 hp. capacity is to be bought by the Sternberg Mfg. Company for its new factory.

Work has been started on the steel frame of the Diamond Lumber Company's new plant at Green Bay, Wis., which is noteworthy as one of the few saw mills ever constructed of that material. In future, however, it will be much more common where permanent plants are to be established.

A report from Racine, Wis., states that merchants and other manufacturers of that place have offered to subscribe $100,000 as a bonus if the Racine Mfg. Company will rebuild the plant that burned last month. The company is said to have been considering a number of good offers of sites and subsidies elsewhere, including Columbus, Ohio. One building was not destroyed, and with assistance rendered by neighboring plants the company's normal production has nearly been maintained.

A machine shop about 50 x 90 ft. will be built at Baraboo, Wis., by the Prothero-McGinnis Auto Company. Some of the equipment needed is understood to have been already purchased, but work on the building will not start until spring.

Ziemer Bros., Kewaunee, Wis., will build an addition to their foundry.

Some new construction will be undertaken in March or April by the Chippewa Falls (Wis.) Canning Company, and additional machinery may be required.

A Filer & Stowell engine of 500 hp. has been put in service at the plant of A. H. Stange Company, Merrill, Wis.

The R. McMillen Company, Oshkosh, Wis., is completing a new woodworking plant and installing machinery, which will probably be added to later in the year, as the demand for the company's products is very heavy.

Work on the Kearney & Trecker Company's new steel-concrete addition at West Allis, Wis., has been delayed in consequence of the excessively cold weather, but the erection will be pushed in the spring, as greatly enlarged capacity is urgently needed.

The Milwaukee Lumber Company will put in a new blower system for removing refuse and conveying it to the furnace. The equipment has not yet been purchased.

A new steel bridge about 10,000 ft. long will be built across the Mississippi River this year at Prairie du Chien, Wis., by the Chicago, Milwaukee & St. Paul Railroad Company.

The downtown building in Milwaukee occupied by the Keelyn Electric Company and the Downey & Kruse Company has been partially destroyed by fire. As both concerns outgrew their quarters there some time ago, it is reasonable to expect that each will lease or build a larger plant of its own.

The Filer & Stowell Company, Milwaukee, has taken contract for two large engines to be installed in the new municipal power station at Cuthbert, Ga., for driving Fort Wayne generators. Damage from fire to the machine shop at the company's Stowell plant, which occurred recently, is being repaired.

During the past year 90 locomotives and nearly 6000 cars were completely built at the West Milwaukee shops of the Chicago, Milwaukee & St. Paul Railroad. This gives some idea of what the purchasing capacity of the plant will be in 1910.

The W. S. Sherman Company, Milwaukee, is putting on the market a line of special woodworking tools, including boring machines, matchers, &c., which are being largely adopted in hardwood flooring factories.

The Monroe, Wis., Electric Light & Power Company has been reorganized as the Monroe Electric Company, with A. A. Boyd president. The equipment and service will be considerably strengthened.

The Milwaukee Bridge Company will construct the steel frame of the Prime Steel Casting Company's foundry addition here, which is to be 65 x 140 ft.

The new plant of the Racine, Wis., Aluminum & Brass Foundry, mentioned in *The Iron Age* some time ago, has been put in operation. Equipment has been provided for a largely increased capacity, but at the rate business is offering, more will need to be installed within a few months.

The Worden-Allen Company, Milwaukee, has the contract for the steel work on the new mill of the John Hoberg Company, Green Bay, Wis., machinery requirements of which were recently given.

From Manitowoc it is reported that the Richards Iron Works have had plans drawn for an automobile plant to be built in the spring or early summer.

The Bucyrus Company, South Milwaukee, has been making extensive additions to its machine equipment and more will be necessary during the year. Besides sales of steam shovels, dredges, &c., which tax the capacity of those departments of the works, the company is taking many orders for some of its later specialties, including a 100-ton wrecking crane for the Chicago, Milwaukee & St. Paul Railroad, locomotive pile drivers for the Chicago & Northwestern Railroad, and a large rotary steam snow plow for the Grand Trunk Railroad. These orders are especially interesting as an indication of the extent to which the railroads are again coming into the market for equipment.

The Wrought Washer Company, Milwaukee, will have a much larger production this year as a result of the construction and equipment of its new rolling mill and shop.

A four story building, 50 x 75 ft., will be added to the factory of the Sheboygan, Wis., Couch Company, and some new machinery, including power apparatus, provided.

It will be necessary to rebuild and re-equip, probably for increased capacity, a part of the Bonell Carriage Company's works at Eau Claire, Wis., which has been damaged by fire.

The Eureka Sander Machine Company, Racine, Wis., is putting out a new line of cutoff saws for pattern shops.

W. L. Playman, Stevens Point, Wis., will take bids on steel and sheet metal for an industrial school building which he has the contract to construct.

A power plant of 1600 hp. capacity, consisting of two engine-driven and one belt-driven dynamo, boilers, heater, pumps, switchboard, &c., will be put in service at Sheboygan, Wis., by the J. M. Kohler Construction Company. All equipment required at present has been provided for, but some auxiliary apparatus may be needed later.

Cincinnati Machinery Market.

CINCINNATI, OHIO, January 18, 1910.

Business in this market has continued on the up grade since the first of the year, and the record for the month's first half has been satisfactory to nearly all interests. Lathes, milling machines and upright drills have been particularly active, and while the smaller and medium sizes of lathes have, as for many months, been most in demand, the interest in heavier and more costly sizes has steadily increased. A local manufacturer of the smaller size lathes reports an order for a carload since the first of the month and indications are that the record of a carload per month, which was maintained for several months during the early months of 1909, will be continued for the early part of 1910.

Manufacturers are somewhat disturbed over the continued silence of the railroads, which, except in a few cases of necessity, have been slow in coming into the market. The reports from traffic associations show that idle cars are being rapidly put in commission, and the shipping interests in some districts seriously disturbed over shortages. This would suggest great activity in the repair departments which need tools. The Pennsylvania Lines have been making some necessary purchases of single tools and machines for certain districts. An improved screw and bolt making machine was installed in the Fort Wayne shops a few days ago, and this is expected to be a forerunner of important additions in all the company's shops. The tool in question is known as an automatic multiple spindle screw machine, capable of handling four pieces at once, the time on each being determined by the time employed on the largest piece. The machine was on exhibition at the convention in Atlantic City last summer of the Master Mechanics and Car Builders. At this same convention there were exhibited some improved types of heavy duty drilling machinery, and these went for the most part into large electric machinery making establishments. The concerns manufacturing these upright types have received some heavy orders in the interval and are now behind from 60 days to three months and longer on orders.

A nice order just booked by the Triumph Ice Machine Company, which has but recently become installed in its new home in the Oakley district, is for a 50-ton ice manufacturing plant for the Compania Frigorifica Cubana, Havana, Cuba. The contract was made by Manager J. Shipman Louis, who has just returned from Cuba.

Local tool builders are anxiously awaiting deliberations on the part of the largest agricultural machinery manufacturing interest looking to the purchase of tool equipment. The list is expected to be approved from the Chicago office. The next largest inquiry for tools that has developed during the week is that of a Rochester, N. Y., foundry interest.

The expericence of the week and month so far in this tool market is somewhat anomalous, in that the tool, which with certain makers has proved a most excellent seller, is admittedly entering upon what appears to be a period of decadence. This is the shaper. The report of one concern making a specialty of this tool, one of the oldest of the Cincinnati manufacturing plants, shows that the smaller and inexpensive sizes have been excellent sellers the past few weeks. This expansion is hardly regarded as permanent, however, and it can be said that all manufacturers of this once most useful and saleable tool are preparing for specializing on other lines. Some, indeed have already done this, as for instance one of the largest local makers of it is now making a specialty of gear cutters; another is manufacturing lathes.

Of the foreign situation there is not much to say; such business as is coming from the other side is mainly from England, or dependent countries. Germany, France and Italy have made great strides in copying the best standard tools of American manufacture, and since the recent depression very little business has come out from those countries.

The jobbing foundries are busy, and with the tendencies of tool makers to order castings for stock, have full order books for from two weeks to two months ahead.

Under the aggressive generalship of President W. F. Robertson of the Robertson Iron & Steel Company, the Manufacturers' Club of Cincinnati promises a full calendar for the year. It has been determined that the monthly dinners will be held at different places—the Queen City Club, the Hotel Sinton, the Business Men's Club, &c. The January meeting was held Monday at the Queen City Club.

The Concrete Steel Construction Company, Cincinnati, has purchased 95 x 150 ft. on Hunt street and will erect at once a manufacturing plant. A. J. Redway is the president and manager.

J. M. Triggs, secretary and treasurer of the Majestic Furnace & Foundry Company, Huntington, Ind., reports a steady increase in his company's business, in the manufacture of furnaces and patented coal chutes. The improvement in the galvanized iron department necessitated enlargement of the second floor and removal of the business offices down to the first floor, which has been done.

Arrangements have been completed at Dayton, Ohio, whereby the National Cash Register Company's plant is to be enlarged and some important mechanical departments added. This is accomplished through the reclamation of some land near the works and the $400,000 boulevard improvement to be made in South Park, where several additional buildings are to be erected. The cabinet works are to be removed to Dayton, and the executive offices have just been transferred from New York City to the home city.

It is reported that the Terre Haute, Indianapolis & Eastern Traction Company is figuring on the removal of its shops from Richmond to Greenfield, Ind.

The Bauer Machine Company, Jeffersonville, Ind., is working on a contract that necessitates the employment of two shifts, and preparations are now being made to put its plant on this basis for several months.

One of the most important and highly successful post-holiday dinner meetings held in Fort Wayne, Ind., was the entertainment on January 6 at the Hotel Anthony, that city, by S. F. Bowser & Co., of their shop foremen and clerks. General Manager A. Z. Polhamus presided and there were formal reports on the new cost system which had been in use a year. It was found that the concern had profited largely through the introduction of the system, which was commended.

Government Purchases.

WASHINGTON, D. C., January 18, 1910.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids January 11, for the following machinery and supplies for the Navy Department:

Class 14.—One complete equipment for forging high speed lathe and planer tools—Bidder 188, Taber Mfg. Company, Philadelphia, Pa., $685.

Class 21.—One horizontal boring mill—Bidder 128, Manning, Maxwell & Moore, $2450; 132, Niles-Bement-Pond Company, New York, $1892; 141, Prentiss Tool & Supply Company, New York, $2200; 146, Pacific Tool & Supply Company, $2650.

Class 22.—One universal back geared milling machine—Bidder 19, Becker Milling Machine Company, Hyde Park, Mass., $1440; 75, Garvin Machine Company, New York, $1211; 89, Harron, Ricard & McCone, San Francisco, Cal., $1640; 113, R. K. Le Blond Machine Tool Company, Cincinnati, Ohio, $1464.25; 128, Manning, Maxwell & Moore, $1575; 146, Pacific Tool & Supply Company, San Francisco, Cal., $1530.

Class 71.—Thirty-three nonreversible pneumatic drilling machines—Bidder 34, Chicago Pneumatic Tool Company, Chicago, Ill., $2095.25; 38, Cleveland Pneumatic Tool Company, Cleveland, Ohio, $2831.40; 101, Ingersoll-Rand Company, New York, $1684.88; 102, Independent Pneumatic Tool Company, Chicago, Ill., $2092; 199, Williams & Wells Company, New York, $2860.26.

Class 72.—Two nonreversible drilling machines—Bidder 34, Chicago Pneumatic Tool Company, Chicago, Ill., $126.40; 38, Cleveland Pneumatic Tool Company, Cleveland, $171.60; 101, Ingersoll-Rand Company, New York, $84.72; 102, Independent Pneumatic Tool Company, Chicago, Ill., $130; 199, Williams & Wells Company, New York, $162.44.

Class 73.—Forty-six nonreversible drilling machines—Bidder 34, Chicago Pneumatic Tool Company, Chicago, Ill., $3385.30; 38, Cleveland Pneumatic Tool Company, Cleveland, Ohio, $4544.80; 101, Ingersoll-Rand Company, New York, $2831.50; 102, Independent Pneumatic Tool Company, Chicago, Ill.; $3325.20; 199, Williams & Wells Company, New York, $3736.12.

Class 74.—Thirteen nonreversible drilling machines—Bidder 34, Chicago Pneumatic Tool Company, $821.20; 38, Cleveland Pneumatic Tool Company, Cleveland, Ohio, $1115.40; 101, Ingersoll-Rand Company, New York, $675.36; 102, Independent Pneumatic Tool Company, Chicago, Ill., $832.05; 199, Williams & Wells Company, New York, $1055.86.

Class 75.—Eleven nonreversible drilling machines—Bidder 34, Chicago Pneumatic Tool Company, Chicago, Ill., $860.90; 101, Ingersoll-Rand Company, New York, $700.19 and $692.58; 102, Independent Pneumatic Tool Company, Chicago, Ill., $850.61; 199, Williams & Wells Company, New York, $1484.12.

Class 76.—Three nonreversible drilling machines—Bidder 34, Chicago Pneumatic Tool Company, Chicago, Ill., $254.70; 38, Cleveland Pneumatic Tool Company, Cleveland, $338.60; 101, Ingersoll-Rand Company, New York, $219.42 and $262.20; 102, Independent Pneumatic Tool Company, Chicago, $253.80; 199, Williams & Wells Company, New York, $550.86.

Class 77.—Seven reversible pneumatic drilling machines—Bidder 34, Chicago Pneumatic Tool Company, Chicago, Ill., $434.10; 38, Cleveland Pneumatic Tool Company, Cleveland, Ohio, $600.60; 102, Independent Pneumatic Tool Company, Chicago, Ill., $448.95.

Class 78.—Nine pneumatic drilling machines—Bidder 34, Chicago Pneumatic Tool Company, $969.60; 102, Independent Pneumatic Tool Company, Chicago, Ill., $925.85; 199, Williams & Wells Company, New York, $1842.75.

Class 79.—Twenty pneumatic hammers—Bidder 34, Chicago Pneumatic Tool Company, Chicago, Ill., $853.50; 38, Cleveland Pneumatic Tool Company, Cleveland, Ohio, $1202.60; 58, Dayton Pneumatic Tool Company, Dayton, Ohio, $452.25; 101, Ingersoll-Rand Company, New York, $409.98 and $415.88; 102, Independent Pneumatic Tool Company, Chicago, Ill., $849.85; 136, George Oldham & Son Company, Philadelphia, Pa., $432; 144, Pittsburgh Pneumatic Tool Company, Canton, Ohio, $361.40; 199, Williams & Wells Company, New York, $745.

Class 80.—Twenty-four pneumatic hammers—Bidder 34, Chicago Pneumatic Tool Company, Chicago, Ill., $1021; 38, Cleveland Pneumatic Tool Company, Cleveland, Ohio, $1443.12; 58, Dayton Pneumatic Tool Company, Dayton, Ohio, $541.75; 101, Ingersoll-Rand Company, New York, $487.64 and $494.88; 102, Independent Pneumatic Tool Company, Chicago, Ill., $1022.60; 136, George Oldham & Son Company, $535; 144, Pittsburgh Pneumatic Tool Company, Pittsburgh, Pa., $434.28; 199, Williams & Wells Company, New York, $954.

Class 81.—Twenty-four pneumatic hammers—Bidder 34, Chicago Pneumatic Tool Company, Chicago, Ill., $2832.75; 38, Cleveland Pneumatic Tool Company, Cleveland, Ohio, $3963.44; 58, Dayton Pneumatic Tool Company, Dayton, Ohio, $1660.75;

101, Ingersoll-Rand Company, New York, $1307.12 and $1320.60; 102, Independent Pneumatic Tool Company, Chicago, Ill., $2787.75; 136, George Oldham & Son Company, Philadelphia, Pa., $1445; 144, Pittsburgh Pneumatic Tool Company, Canton, Ohio, $1193.54; 199, Williams & Wells Company, New York, $2788.50.

Class 82.—Thirty-two pneumatic scaling hammers—Bidder 34, Chicago Pneumatic Tool Company, Chicago, Ill., $1028.60; 38, Cleveland Pneumatic Tool Company, Cleveland, Ohio, $1846.40; 101, Ingersoll-Rand Company, New York, $619.12; 102, Independent Pneumatic Tool Company, Chicago, Ill., $1657.70; 144, Pittsburgh Pneumatic Tool Company, Canton, Ohio, $577.04; 199, Williams & Wells Company, New York, $1192.

Class 91.—One 10-hp. machine gasoline engine—Bidder 78, Gas Engine & Power Company, Morris Heights, N. Y., $667; 99, Hoisting Machinery Company, New York, $715; 117, Land Engine Company, New York, $615.38; 135, Otto Gas Engine Works, New York, $990; 175, Sterling Engine Company, Buffalo, N. Y., $564.20; 187, Tasker & Strawbridge, Philadelphia, Pa., $550; 210, Progressive Mfg. Company, Torrington, Conn., $650.

Class 92.—One two-cylinder horizontal marine gasoline engine—Bidder 210, Progressive Mfg. Company, Torrington, Conn., $650.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids February 8 for the following machinery and tools:

Schedule 2170, three pipe threading and cutting machines; schedule 2171, one oxy-acetylene welding and cutting plant; schedule 2173, one engine lathe; schedule 2174, equipment for power plant at Indian Head, Md.

Miscellaneous Machinery and Power Equipment.

The Electric Storage & Battery Company, Minneapolis, Minn., recently organized and capitalized at $60,000, is erecting an electric garage at a cost of $20,000.

The American Automatic Railway Brake Company, Baker City, Ore., has been incorporated with $500,000 capital stock to manufacture an automatic brake which applies all brakes on the train the instant any wheel of a car leaves the rails. The incorporators are F. W. Eppinger, H. A. Mitchell and E. B. McDaniels.

The Stierlin Piano Company, St. Louis, Mo., is planning the erection of a new factory building which will cost $23,000.

The Missouri Ice, Light & Power Company, Charleston, Mo., is having plans prepared for power and ice plant to be erected in Mississippi County by Matthews & Clark, 705 Olive street, St. Louis, Mo.

The Pacific Motor Car Company, Spokane, Wash., recently incorporated and capitalized at $50,000, will soon break ground for a new garage which will cost $10,000, to be ready for occupancy within two months.

The C. Hager & Sons Hinge Mfg. Company, St. Louis, Mo., is having plans prepared for an addition to its factory 85 x 144 ft. The new addition will cost $25,000, and will be used for the manufacture of hinges.

The Glastonbury Power Company, Manchester, N. H., is understood to have completed plans for the new turbine power plant which has been contemplated for some time past. Equipment will be provided for in the near future.

Power and woodworking machinery will be required by Carr, Ryder, Adams & Co. for a new plant at Dubuque, Iowa.

Bids for four steam boilers are being taken by the Kneeland-Bigelow Company, Bay City, Mich., and additional equipment will be bought during the year.

New electric generating machinery will be provided this spring for the power service of the Waycross Electric Light & Power Company, Waycross, Ga., which has passed under the control of other interests. A larger station will probably be erected.

The Burley Heater Company, Tyrone, Pa., which is putting on the market a new type of sectional boiler, will be compelled before the end of the present year to still further extend its plant.

The Saranac Machine Company, St. Joseph, Mo., contemplates erecting a branch plant elsewhere for the manufacture of wire stitching apparatus.

Plans for a factory, with woodworking machinery, motor drive, &c., are being put in execution by the Chattanooga Chair Mfg. Company, Chattanooga, Tenn.

Carl Tschpen, Havre, Mont., will be in the market this spring for pumping machinery.

Bids are being taken on steel and concrete buildings, and machinery will be purchased shortly for a 2000-bbl. cement plant to be erected by the People's Portland Cement Company at Squaw Bay, and not far from Spokane, Wash. Rotary kilns, tube mills, ball mills or komminutors, coolers, engines, generators, motors, crushers, &c., will be required for the plant.

Purchase of pumping machinery for municipal water works will probably be decided upon next month at Huntsville, Mo.

Plans for the new pumping plant at Monett, Mo., are being prepared and bids on machinery will be taken in the near future.

The C. C. Mengle & Bro. Company, Louisville, Ky., is reported to contemplate building a veneer factory outfitted with motor driven saws.

The Oscar Lear Motor Company will build works at Springfield, Ohio, equipped throughout for electric motor drive. An engine, generator and large line of tools will be provided for in the near future.

A hydro-electric plant is to be built in the vicinity of Chico, Cal., by the Deer Creek Power Company of that place.

Purchase of a new pump is said to be contemplated by the Kelso Electric Company, Spokane, Wash.

The property formerly operated by the Pacific Cement Company has been bought by F. R. Clark, Spokane, Wash., who is planning to install machinery for a 3000-bbl. mill, making it one of the largest plants in the West.

A large plant equipped with power driven refrigerating machinery will be erected in Philadelphia by the Waldemar Martensen Company.

Some new machinery is to be installed in the near future by the Northwestern Lumber Company, Kalispell, Mont.

One or more steel bridges will be built this year on the line of the Indiana Union Traction Company, Muncie, Ind.

The plant of the Clarksville, Tenn., Electric Light & Power Company is to be enlarged in capacity. A turbine set may be added to the generating equipment.

E. A. Martin, Joplin, Mo., has organized the Martin Machinery Company to manufacture and deal in equipment for the industries of the district.

It is understood that some additional machinery, including power equipment, will be required in the near future by the San Diego, Cal., Consolidated Brewery Company, which is planning extensions.

Machinery for increasing the capacity of the Houston, Texas, Lighting & Power Company's plant, as recently forecasted, will be purchased in the near future. An issue of $500,000 additional stock is being provided for improvements.

A central station to furnish power and lighting will be built by M. Greenspun, Mt. Pleasant, Tenn.

The Beatrice Lawn Mower Company and Jons Auto Company, Beatrice, Neb., have passed under one control and will strengthen their production facilities. C. C. Jones is president.

The Davis Sewing Machine Company, Dayton, Ohio, is about to add to its shop equipment, including electrical apparatus.

Machinery is about to be purchased for the water works at Jellico, Tenn., plans of which were mentioned some weeks ago.

The project for a pumping plant at Vermont, Ill., has reached the stage where equipment will be bought.

An electric power station of moderate capacity will probably be put in service before next fall at Arlington, S. D.

The crushing plant of the Muskogee, Okla., Crushed Stone Company will be enlarged.

The Bridgeport, Ala., Electric Light & Power Company, W. G. Scarborough, president, is erecting a generating plant. The initial equipment, which has already been provided for, will be extended later on.

A new boiler is needed for the plant of Fred Hoffman's Sons, Youngstown, Ohio, where an explosion occurred about the first of the year.

A steel tank is to be bought for the water works at Minneapolis, Minn.

The city of Clinton, La., whose requirements for a municipal power plant were recently mentioned, has bought the engine and dynamo operated by a local factory and will remove them to the new station. Some auxiliary equipment will still be needed.

The Spivey Mfg. Company will build a factory at Spivey, Tenn.

Geo. W. St. Clair, Tazewell, Va., will probably require machinery later in the year at Richlands, Va., for mining coal and handling it at the surface.

A Corliss engine and dynamo will be installed by the Pennsylvania Railroad Company, at the Harrisburg, Pa., terminals.

The Cadillac Chemical Company, Cadillac, Mich., will put in a machine shop and make other additions auxiliary to its works.

It is probable that a pumping engine will be purchased this year at Gadsden, Ala., to replace existing units which are not equal to the service required.

Machinery has been bought by the Gulf Cooperage Company, Texarkana, Ark., for a new plant. Later in the year some further equipment will be needed.

Machine tools for repair work, motors, &c., will be bought by the People's Railway Company, Dayton, Ohio, for new car barns and shop.

Power and saw mill machinery may be bought shortly by the Kingsdale Lumber Company, Lumberton, N. C., for a new plant.

A 2500-ton hydraulic press will be installed by the South Carolina Warehouse Corporation, Charleston, S. C.

A hydro-electric power plant is to be constructed for municipal lighting service by Lavonia, Ga.

A motor-truck plant will be built at Denver, Colo., by the Universal Motor Company. Machinery requirements have not yet been fully determined upon.

A pumping unit will be bought next month at Vernal, Utah, for the new municipal water works.

A line of alternating current motors and other electrical apparatus is required for the plant of the Columbia Brick Company, Gresham, Ore.

Water works will probably be built this spring at Park City, Pa.

Construction of a steam turbine power plant will be undertaken next summer by the Iowa City, Ottumwa & Southwestern Electric Railway, Iowa City, Ia.

The Hanson-Ward Company, Bay City, Mich., is completing a new flooring factory. The initial equipment has been purchased, but more will be needed later on.

A large clay-products plant, with extensive machinery equipment, will be built at South Coffeyville, Okla., by the Meiemberg Terra Cotta & Brick Company.

A Corliss air compressor is to be purchased for the water works at Grinnell, Iowa.

The water works board at Brainerd, Minn., has been given authority to purchase a new pumping unit.

Another large pressure cylinder of heavy rolled plate will probably be installed at the impregnation plant of the Ayer & Lord Tie Company of Chicago, at Argenta, Ark. Considerable auxiliary apparatus, including pumps, compressor, &c., may also be needed.

Electric generating machinery and auxiliary apparatus will be purchased shortly for a new power plant to be constructed at Pendleton, Ind., by the Municipal Light & Power Company.

Construction of a pumping plant for water supply is under consideration at Lake Park, Ga.

Fuller, Coult & Co., St. Louis, Mo., have drawn plans for a hydro-electric power plant of 6000 kw. capacity, utilizing low head impulse turbines, to be located near Murfreesboro, Ark.

Carlyle Peck, Starke, Fla., is proceeding with plans for the erection of a woodworking plant there.

A plant for the manufacture of motor vehicles will be built at Garrett, Ind., by the Hoosier Automobile Company, lately organized. Machine tools, power, electrical and pneumatic apparatus will be required, but equipment details have not yet been entirely decided upon.

An electric power plant and motors for machinery drive will be installed by the Sumter, S. C., Telephone Mfg. Company.

Boilers having a capacity of 1800 hp. will be bought by the water board of Kansas City, Mo., to furnish steam for the pumping machinery recently ordered built for the Quindaro Station.

Some new machinery will be needed during the year by the Kelsey Lumber Company, Fort Worth, Tex.

A mechanical filtration plant may be installed in the spring at Tishomingo, Okla. An electric power station for municipal service is also contemplated.

A new electric power plant will be installed at Chadron, Neb., by the Chadron Electric Company.

Equipment details are now being worked out for car and locomotive repair shops to be erected at Goldfield, Nev., by the Tonopah & Goldfield Railroad Company. Power from the hydro-electric plant at Bishop's Creek will probably be used.

A pumping engine of considerable capacity will be bought at some time within the present year for municipal service at Painesville, Ohio.

The Alberta Clay Products Company, Medicine Hat, Ala., whose requirements were mentioned some weeks ago, is arranging for the installation of a 500 hp. power plant, consisting of three tubular boilers, Corliss engine, dynamo, pumps, heater, &c. Headquarters for the present are at Webster City, Ia.

Decision has been reached at Foss, Okla., to construct water works, and pumping machinery will be provided for shortly.

Equipment for the municipal power and pumping plant at Marion, Kan., recently mentioned, will be furnished by the Squires Electric Company, Kansas City, Mo.

New boilers, engines, &c., will probably be purchased shortly by the Monarch Coal Company, Pennington Gap, Va., for a power plant to replace one that recently burned.

The Antietam Electric Light & Power Company, Boonsboro, Md., is installing a Corliss engine of 125 hp.

R. W. Hurlbut, Merrillville, Cal., has put in a sawmill operated by direct drive from a turbine water wheel, which is one of the few such instances on record.

The Judson Mfg. Company, San Francisco, has taken the contract for structural iron and steel work on a large factory to be erected by the National Electric Lamp Company, at Oakland, Cal. The headquarters of the latter is at Cleveland, and all shop equipment will be ordered from there.

Gordon & Ferguson, St. Paul, Minn., have arranged for the erection of a new factory, with power equipment, at St. Cloud, Minn.

A converter and transformer substation will be built in connection with the Merced Falls Gas & Electric Company's power plant at Merced, Cal.

A steam turbine and generator of about 275 hp. will be added some time this year for the electric power plant of the Monte Vista, Colo., Electric & Gas Lighting Company.

Unless suitable provision is made for taking over the plant of the local water company at Issaquah, Wash., municipal water works will be built.

Electric motor drive is to be used in the large new factory of the Loughran Cabinet Company, recently mentioned, which will be completed in the spring.

Some additional equipment will be ordered this winter for the main generating station of the Pueblo & Suburban Traction Company, Pueblo, Colo.

Extension of the American Box Company's plant at Lynchburg, Va., is contemplated.

The Eclipse Mill Company, Everett, Wash., is installing new machinery, including gang saws, edgers, &c., which will largely increase its capacity.

Power and wood-working equipment is to be provided for the Leathers Handle Factory at Dickson, Tenn., work on the foundation of which was recently started.

An electric generating station of considerable size will be built by the Central California Traction Company, Sacramento, Cal., for operating its extended lines, in addition to the power facilities already provided for.

Decision on the improvement of the municipal power station at Altus, Okla., will be reached early in February. Meanwhile plans for new equipment are under advisement.

The Kelley Island Lime & Transport Company has determined upon the installation of a large line of electrical machinery in connection with its properties near Martin's Station, Ohio.

The city of Waterloo, Ont., Ford S. Kumpf, secretary Light Commission, will soon receive bids for the electrical equipment for the new municipal electric plant. Contracts for construction of the power house have been awarded.

The Kansas City Southern Railway, A. F. Rust, resident engineer, Kansas City, Mo., will erect a roundhouse and machine shop. The Arnold Company, Chicago, Ill., has the contract for these buildings, and also for six other small additions.

The Western Pacific Railroad Company, with headquarters at San Francisco, Cal., advises it owns a site at Sacramento on which it is purposed to erect shops. Plans have not yet been prepared, and it will probably be next summer before anything definite regarding machinery requirements will be known.

Bids will be opened February 3 by the city of El Paso, Texas, for furnishing equipment for an incinerator, sewage pumping station, &c. Included in the machinery required are two horizontal 125 hp. water tube boilers, two direct connected engine driven 65 kw. generating sets, three direct connected motor driven vertical pumping units, each with a capacity of 2,000,000 gal. per 24 hours; an electric traveling crane and other apparatus. Plans and specifications may be obtained from Percy McGhee, city clerk, El Paso, Texas, and they can also be seen at the office of Hering & Fuller, consulting engineers, 170 Broadway, New York.

The Haywood Tire & Equipment Company has been organized at Indianapolis, Ind., to manufacture, repair and deal in motor vehicles, tires, tools, &c. The directors are F. H. Rupert, M. Rupert and M. E. Haywood.

The Moore Mfg. Company is building a factory at Normal City, a suburb of Muncie, Ind., for the manufacture of bedroom furniture. E. J. Hickson is one of the stockholders.

The Sandborn-Marsh Electric Company, Indianapolis, Ind., received the contract for the new city hall lighting fixtures at $23,295.

The Globe Furniture Company, Evansville, Ind., has increased its capital stock from $50,000 to $150,000. A. G. Harges is president. The Bosse Furniture Company of the same city has also increased its capital stock from $50,000 to $150,000. Benjamin Bosse is president.

The Coin-Controlling Lock Company has been organized at Indianapolis, Ind., to manufacture a specialty. W. H. Kluge, Anna Kluge and J. H. Rosenberg are the incorporators.

The Beech Grove Traction Company has been organized and incorporated at Indianapolis, Ind., to build and operate a line between that city and a suburb, Beech Grove. The directors are William H. Ogan, Dayton, Ohio, Morton S. Hawkins, attorney, and Samuel E. Hamlin of Indianapolis.

Milton and John Retherford of Muncie, Ind., will build a factory there for the manufacture of gas and electric fixtures and gas mantels.

The Brookville Furniture Company, Brookville, Ind., is building a four-story brick extension, 40 x 123 ft. The machinery in this addition will be driven by motors, the power to be generated in a new power house of concrete, now in the course of construction.

The contract for the mechanical equipment of the Indiana State School for the Deaf has been awarded to Woollen & Callon of Indianapolis, Ind., at $39,275.

The Brazil Hollow Brick & Tile Company, Brazil, Ind.,

has been incorporated with $150,000 capital stock to manufacture brick, hollow block, sewer pipe, &c. The directors are John F. Brown, James S. Haywood and Thos. S. McCrea.

The Ricketts Auto Company has been incorporated at Indianapolis, Ind., with $30,000 capital stock, to manufacture auto parts. The directors are R. Ricketts, L. F. Ricketts and E. Ricketts.

The Macbeth-Evans Glass Company, Marion, Ind., is planning a considerable extension to the machine shop.

The Direct Drive Mfg. Company has been organized at Indianapolis, Ind., and incorporated with $50,000 capital stock to manufacture auto parts, including transmission gears. The directors are Wallace M. Parkinson, Wm. H. Parkinson, Harry E. Parkinson, A. A. Downing, B. F. Meixwell and E. O. Call.

The Goliad Irrigating Machinery Company, Goliad, Texas, is in the market for second-hand machinery, such as large lathes, planers, &c.

The Fort Wayne & Wabash Valley Traction Company of Indiana will build shops to cost $500,000, and the Fort Wayne Commercial Club, Fort Wayne, Ind., has appointed a committee to induce the company to select that city as the location.

The Peat Product Company of Lima, Ohio, has taken leases in St. Joseph County, Indiana, of which South Bend is the county seat, and will erect a plant on 1500 acres of marsh land.

The Co-Auto Motor Company has been organized at Indianapolis, Ind., and incorporated with $25,000 capital stock to manufacture motor cars. The directors are Mark G. Beckner, John Harrison, Fred W. Wiese and Harry W. Woodmansee.

The N. & C. Steel Products Company has been organized at Decatur, Ind., and incorporated with $10,000 capital stock to make cast steel products. The directors are J. G. Niblack, L. W. Coppock and C. S. Niblack.

The Planhard Mfg. Company, Kokomo, Ind., has increased its capital stock from $15,000 to $100,000. W. D. Parr is president.

The Shoals Power Company has been organized and incorporated at Shoals, Ind., with $50,000 capital stock to furnish light and power. The directors are Henry A. Mansfield, Samuel A. Teacher, Frederick W. Bachman, Frank T. Edenharter and William T. Mull. Mr. Mansfield, who is at the head of the company, is of Indianapolis, Ind.

The Standard Automobile Company of America has been organized at Wabash, Ind., and capitalized at $500,000 to manufacture automobiles. The directors are G. J. Kobusch, W. S. McCall, A. R. Walton, W. B. Phelps and F. D. McMahan.

The Indiana Concrete & Machinery Company has been incorporated at Indianapolis, Ind., with $25,000 capital stock to carry on a general concrete and machinery business. The directors are Carey L. Smith, Harry Bowser, James C. Hill and Joseph E. Harris.

William J. Breen, for the past eight years resident manager for New England of Hugh W. Adams & Son, New York, has organized the firm of William J. Breen & Co., with offices at 84 State street, Boston, to deal in foundry pig iron and coke. Mr. Breen is well known to the foundry trade of New England, and is prominent in the New England Foundrymen's Association, having served for several years on the Executive Committee, and having taken an active part on the committee which investigated the matter of shortages in shipments of pig iron, coke and coal. The firm has the agency of the Clare Coke Company.

The National Brake & Electric Company, Milwaukee, Wis., has just completed the installation of a 20-ton open hearth oil fuel furnace of the Swindell type for making open hearth steel castings. The capacity of this furnace is three heats a day, making a maximum capacity of 60 tons daily of open hearth castings. The furnace will be used primarily in the company's own business, but some of its capacity may be used on contracts for steel castings.

Industrial Statistics, comprising Part III. of the annual report of the Secretary of Internal Affairs, has been received from John L. Rockey, chief of the bureau. While it gives much industrial and labor information, specially interesting reports are made on sociological conditions of the cities of Altoona, Chester, Lancaster, Wilkes-Barre, Williamsport and York.

The annual general meeting of the Iron and Steel Institute will be held at the Institution of Civil Engineers, Great George street, London, S. W., on Wednesday and Thursday, May 4 and 5. The annual dinner will be held, under the presidency of the Duke of Devonshire, in the Grand Hall of the Hotel Cecil, on Wednesday. To be included in the voting list at the annual meeting applications from candidates for membership of the Institute must be received at the office of the Institute not later than March 15. The council will shortly proceed to award Carnegie research scholarships, and candidates must apply before February 28, on forms which can be obtained at the offices of the Institute. The awards will be announced at the annual general meeting. The autumn meeting will be held at Buxton, September 27, 28 and 29.

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CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:
1 to 1¼ in. round and square ... ₩ lb 2.00¢
1½ to 4 in. x ⅜ to 1 in. ... ₩ lb 2.00¢
1½ to 4 in. x ¼ to 5-16 ... ₩ lb 2.20¢
Rods—¾ and 11-16 round and square ... ₩ lb 2.20¢
Angles: Cts ₩ lb
3 in. x ¼ in. and larger ... 2.25¢
3 in. x 3-16 in. and ⅛ in. ... 2.50¢
1½ to 2½ in. x ⅛ in. ... 2.35¢
1½ to 2½ in. x 3-16 in. and thicker ... 2.25¢
1 to 1¼ in. x 3-16 in. ... 2.35¢
1 to 1¼ x ⅛ in. ... 2.45¢
⅞ x ⅛ in. ... 2.55¢
¾ x ⅛ in. ... 2.65¢
⅝ x ⅛ in. ... 3.70¢
½ x 3-32 in. ... 4.50¢
Tees:
1 in. ... 2.50¢
1¼ in. ... 2.60¢
1½ to 2½ x ¼ in. ... 2.30¢
1½ to 2½ x 3-16 in. ... 2.50¢
3 in. and larger ... 2.30¢
Beams ... 2.25¢
Channels, 3 in. and larger ... 2.25¢
Bands—1½ to 6 x 3-16 to No. 8 ... 2.45¢
"Burden's Best" Iron, base price ... 3.25¢
Burden's "H. B. & S." Iron, base price ... 3.05¢
Norway Bars ... 3.50¢

Merchant Steel from Store—

per lb
Bessemer Machinery ... 2.00¢
Toe Calk, Tire and Sleigh Shoe ... 2.50@3.00¢
Best Cast Steel, base price in small lots ... 7¢

Sheets from Store—

Black	One Pass, C.R Soft Steel.	R. G. Cleaned.
No. 16	₩ lb 2.90¢	3.00¢
Nos. 18 to 21	₩ lb 2.95¢	3.10¢
Nos. 22 and 24	₩ lb 3.05¢	3.20¢
No. 26	₩ lb 3.10¢	3.30¢
No. 28	₩ lb 3.20¢	3.50¢

Russia, Planished, &c.

Genuine Russia, according to assortment ... ₩ lb 12 @14½
Patent Planished, W. Dewees Wood. ₩ lb A, 10¢; B, 9¢ net.

Galvanized.

Nos. 14 to 16 ... ₩ lb, 3.30¢
Nos. 22 to 24 ... ₩ lb, 3.55¢
No. 26 ... ₩ lb, 3.75¢
No. 28 ... ₩ lb, 4.10¢
No. 28 and lighter 36 inches wide, 25¢ higher.

Genuine Iron Sheets—

Galvanized.
Nos. 22 and 24 ... ₩ lb ..5.75¢
No. 26 ... ₩ lb ..6.25¢
No. 28 ... ₩ lb ..7.25¢

Corrugated Roofing—

2½ in. corrugated.	Painted	Galvd.
No. 24	₩ 100 sq. ft. $3.85	4.80
No. 26	₩ 100 sq. ft. 2.95	4.00
No. 28	₩ 100 sq. ft. 2.60	3.75

Tin Plates—

American Charcoal Plates (per box.)
"A.A.A." Charcoal:
IC, 14 x 20 ... $6.35
IX, 14 x 20 ... 7.00
A. Charcoal:
IC, 14 x 20 ... $5.40
IX, 14 x 20 ... 6.50
American Coke Plates—Bessemer—
IC, 14 x 20 ... 107 lb ... $4.40
IX, 14 x 20 ... 5.40
American Terne Plates—
IC, 20 x 28 with an 8 lb. coating ... $8.50
IX, 20 x 28 with an 8 lb. coating ... 10.50

Bolts—

Carriage, Machine, &c.—
Common Carriage (cut thread):
⅜ x 6 and smaller ... 70&7½%
Larger and longer ... 65&5%
Common Carriage (rolled thread):
⅜ x 6, smaller and shorter ... 70&12½%
Phila. Eagle, $3.00 list ... 80&5@80&10%
Bolt ends with C. & T. Nuts ... 65&5%
Machine (Cut Thread):
⅜ x 4 and smaller ... 70&12½%
Larger and longer ... 65&10%

Nuts

Blank or Tapped.
Cold Punched: Off list.
Square ... 4.90¢
Hexagon ... 5.50¢
Square, C., T. & R. ... 5.30¢
Hexagon, C., T. & R. ... 6.10¢
Hot Pressed: Off list.
Square ... 5.40¢
Hexagon ... 5.80¢

Seamless Brass Tubes—

List November 13, 1908. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price 18¢

Copper Tubes—

List November 13, 1908. Base price 22¢

Brazed Brass Tubes—

List August 1, 1908. 20½¢ ₩ lb

High Brass Rods—

List August 1, 1908. 15¼¢ ₩ lb

Roll and Sheet Brass—

List August 1, 1908. 15¼¢ ₩ lb

Brass Wire—

List August 1, 1908. 15¼¢ ₩ lb

Copper Wire—

Base Price. Carload lots mill 15¼¢

METALS—

Tin—

Straits Pig ... ₩ lb 36@36½¢

Copper—

Lake Ingot ... ₩ lb 14¾@15 ¢
Electrolytic ... ₩ lb 14¾@15 ¢
Casting ... ₩ lb 14¼@14½¢
Sheet Copper Hot Rolled, 16 oz (quantity lots) ₩ lb 18 ¢
Sheet Copper Cold Rolled, 1¢ ₩ lb advance over Hot Rolled.
Sheet Copper Polished 20 in. wide and under, 1¢ ₩ square foot.
Sheet Copper Polished over 20 in. wide, 2¢ ₩ square foot.
Planished Copper, 1¢ ₩ square foot more than Polished.

Spelter—

Western ... ₩ lb 7 @7¼¢

Zinc.

No 9, base, casks ... ₩ lb 8¼¢ | Open ... ₩ lb 9¢

Lead.

American Pig ... ₩ lb 5¼@5¾¢
Bar ... ₩ lb 6¾@6¾¢

Solder.

½ & ½, guaranteed ... ₩ lb 21½@22 ¢
No. 1 ... ₩ lb 18½@19 ¢
Refined ... ₩ lb 16½@17 ¢
Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson ... ₩ lb ..@10¢
Hallett's ... @10¢
Other Brands ... @9¼¢

Bismuth—

Per lb $2.00@$2.25

Aluminum—

No 1 Aluminum (guaranteed over 99% pure), in ingot for remelting ... 34¢
Rods & Wire ... Base Price 31¢
Sheets ... Base Price 33¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	₩ lb 11.75@12.00
Copper, Heavy and Wire	₩ lb 11.25@11.50
Copper, Light and Bottoms	₩ lb 10.25@10.50
Brass, Heavy	₩ lb 8.00@ 8.25
Brass, Light	₩ lb 6.50@ 6.75
Heavy Machine Composition	₩ lb 10.50@10.75
Clean Brass Turnings	₩ lb 7.50@ 7.75
Composition Turnings	₩ lb 8.75@ 9.00
Lead, Heavy	₩ lb ....@ 3.75
Lead, Tea	₩ lb ....@ 3.50
Zinc Scrap	₩ lb ....@ 4.50

THE IRON AGE

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